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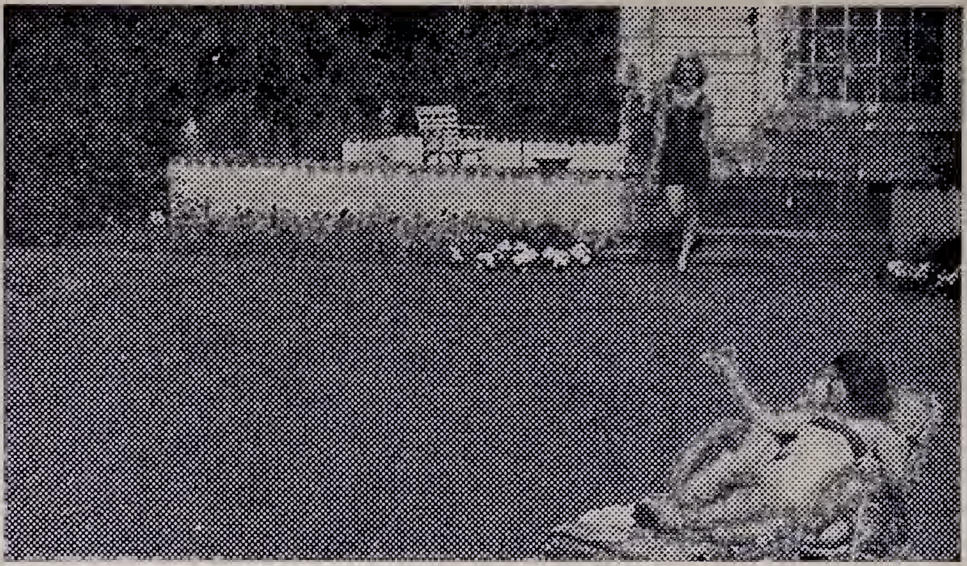

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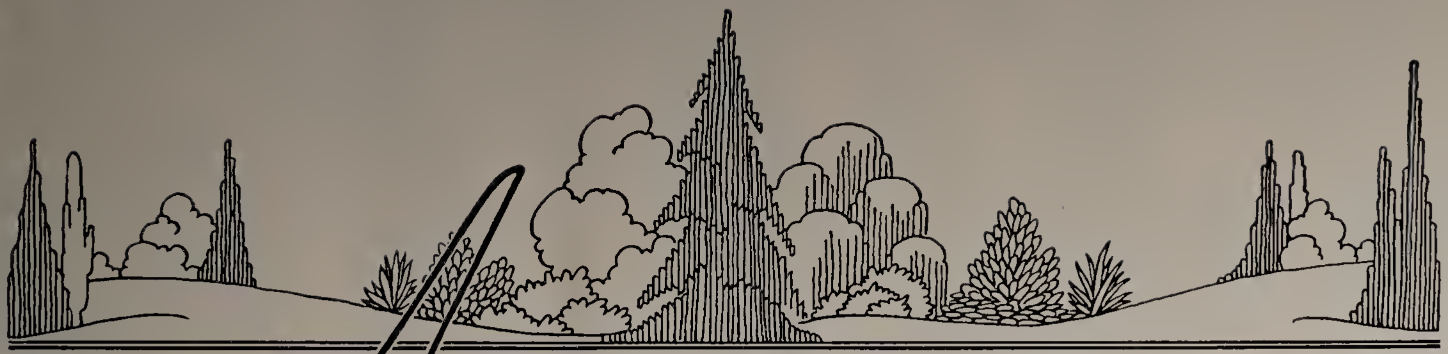

The Arboretum Bulletin

VOLUME XIII SUMMER, 1950 NUMBER 2

The Arboretum in the Spring

BRIAN O. MULLIGAN

AFTER the departure of the snow in early February, work was continued on the clearance of the narrow strip of ground between the Boulevard and the parking lot by the East Madison Street playfield. This section had not been touched for five or six years and the brambles had in many places almost overwhelmed the trees and shrubs planted there at an earlier date. The transformation after their removal, as well as a number of surplus or partly dead trees, was quite remarkable; anyone now driving along the Boulevard is able to see the trees in the background, especially the Japanese cherries, which had previously been almost invisible. Further minor clearance and considerable cultivation work remains to be done later to this strip, which will then be partially sown with grass and partially planted with groups of suitably sized shrubs. Farther north, by the junction with Boyer Avenue, a small area of about an acre was thinned out by removing a number of wild nut bushes and overcrowded native trees, to leave an area which in the future can certainly be made attractive with plantings of Rhododendrons and Azaleas for which it seems especially adapted, being shaded by tall maples and having a natural growth of ferns beneath. Time did not permit us to continue any farther here; more clearance in that area will now have to await next winter.

A little to the east, between the Boulevard and Azalea Way, a number of unnecessary young Ash trees were removed from an area which is badly drained where they had not been doing well. Northwards along the Boulevard, opposite Miller and Roanoke Streets, preparations were made during early March by removal of a number of young Poplar trees and by cultivation of the ground for the planting of our new collections of Crabapples and Rose species, in land which formerly was part of the old city dump and is now included within the Winkenwerder Memorial area. This planting will be referred to later. More cultivation by tractor was done during the spring months in the center section of Foster's Island at the northern end of the Arboretum, where a certain amount of planting has been carried out during the past three winters but no systematic cultivation had as yet been undertaken. This is principally to eliminate the risk of fire caused by the amount of dry fern in the late summer or early spring. During the process large numbers of roots were raked up and removed from the ground which will be further cultivated during the summer in preparation for sowing with grass in the early fall. The former nursery known as the Army Garden, opposite the Magnolia collection along the Upper Road, has now been vastly improved by thorough harrowing both with disk and spike harrows followed by raking and rolling. This also we plan to plant during next winter with shrubs of Mock Orange family *(Philadelphus, Deutzia, Ribes, Hy-*

drangea, etc.) At the same time we took the opportunity to cut back numerous young Willow and Alder trees hanging over our eastern fence line, which not only greatly improves the appearance of the area but also eliminates sources of weed trees in the future, as well as hosts of the tent caterpillar.

In the nursery itself the road leading up to it by the greenhouses was thoroughly repaired and raised during April, with a ditch dug on the east side to eliminate surplus water, while the old nursery ground opposite to it has been cultivated once or twice in order to break up the thick mat of grass and weeds which has covered it. The improvement of this ground, however, will be a slow process.

More than three tons of superphosphate have been applied to the grass areas throughout the Arboretum this spring. Many of the planted and mulched beds also have received an application of fertilizer. Through the kindness of the Park Department, we have been able to haul in many loads of cinders from their usual source of supply and these have been spread on many of the trails where the need was greatest. Other very acceptable gifts to the Arboretum during the past few months have been sixty loads of old wood chippings (hog fuel) from the Stimson Lumber Company at Ballard, many truck loads of shavings from the Totem Lumber Company, used in mulching our beds of shrubs, and four loads of old power poles, cut to twenty feet in length, from City Light. Some of these have been used in supporting part of the bank by the Upper Road opposite the greenhouses where it had become necessary to fill, grade, and cover with sod the sections cut off when the road was resurfaced almost a year ago. Many of the young trees along Azalea Way, in the Oak section and elsewhere, have been cleaned of grass around their stems and given a mulch of shavings which not only benefits them but also improves the appearance of the whole area. Many dead plants have, unfortunately, had to be removed this spring following our abnormally severe winter, including a truck load of *Rhododendron arboreum* from the head of Rhododendron Glen, as well as plants of *Cistus, Ceanothus,* Laurustinus, and others, either wholly or partially. Spraying with 2-4-D against dandelions and other weeds has been done along Azalea Way and some other sections in mid-May, but as yet we have not had to carry out this campaign against tent caterpillars which do not appear to be severe this season.

Throughout the spring a continued program of replacing old labels, adding new ones and checking on the card index of plants growing in the Arboretum has been carried on systematically by Dr. Naumann. This essential work has been much in arrears since the war but these we now hope will gradually be overtaken, providing better information for visitors seeking plant names and also bringing our own records up to date.

Plantings

Spring planting began again in mid-February and has continued up to the date of writing in late May. During those three months more than 2,000 plants have been set out in many parts of the Arboretum, ranging from Montlake Boulevard in the northwestern corner to the Oak collection and lagoon banks at the north end, and down Azalea Way to its southern entrance by the Boulevard. Rhododendrons and Azaleas alone amounted to almost one-half that number, since we have had so many in the nursery requiring moving for a number of years past, but a great many of the latter in particular have now been transplanted. It is worth mentioning that we have planted nine Rhododendron hybrids in groups of four or five plants of each on the bank near the north entrance overlooking the lagoon, previously a very colorless section through much of the year. One of the largest plantings was that of the Crabapples and *Rosa* species in the section mentioned earlier, opposite Miller and Roanoke Streets, where we set out nearly fifty Crabapples of twenty kinds, and sixty plants of Rose species representing twenty-eight kinds, together with thirty of the old-fashioned varieties given to us by Unit

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One of the finest forms of the Western Dogwood in Arboretum—May, 1950.

—PHOTO BY E. F. MARTEN

No. 3 of the Lake Washington Garden Club. Along the northwest boundary near Hamlin Street three new beds of shrubs have been planted, one beside the Boulevard with the yellow *Rhododendron (Azalea) luteum,* another with a mixed selection of shrubs flowering at various seasons of the year, and the third, towards the east end, with *Stranvaesia undulata.* In the ground between that and the Winkenwerder Memorial area additional young trees of several *Sorbus* species, *Oxydendrum,* the Sorrel tree, and the attractive Japanese *Cercidiphyllum* have been placed, as well as groups of the shrubby *Callicarpa* and the Wax Myrtle, *Myrica cerifera.* In Woodland Garden considerable additions have been made since last fall, including large beds of Viburnums, Azaleas, Salal *(Gaultheria Shallon),* Mahonias, Huckleberries *(Vaccinium),* Manzanitas and smaller groups of *Hamamelis,* Mountain Laurels, *Philadelphus, Fothergilla,* etc.

During March we added to the Winter Garden more than a hundred plants in five varieties of *Erica carnea,* and in April specimens of *Hamamelis, Corylopsis* and *Rhododendron praecox.* Nearly all these plants were the gift of the sponsoring Mercer Island Garden Club.

Along the Boulevard south of Boyer Avenue have been planted young trees of red Oaks, Washington Thorns and Crabapples, generally in groups of three, while on the bank above them to the west a number of Lilac species have been set out. Near the Upper Road, along the Broadmoor fence just south of Rhododendron Glen, a wide border dug last winter has now been filled with varieties of *Camellia Sasanqua,* some to be trained to the fence, others in front of them; thirty plants in all. In the same neighborhood additions have been made to the collections of Hebes, some of which have been considerably damaged by the past winter, and to the Hypricums, to which the same applies. A collection of Fuchsias has again been set out in the parking lot immediately north of the East Lynn Street bridge.

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Upper—Area surrounding lagoon, north end of Arboretum, September, 1948.
Lower—Same view, May, 1950.
—PHOTOS BY E. F. MARTEN

Acquisitions

(a) Seeds

As usual, many collections have been received in exchange from Botanical Gardens and Arboreta in many parts of the world; not only from this continent and Europe but also from South Africa, Japan, Australia and New Zealand. We have been fortunate in receiving seven packets of hybrid Pine seeds from the Institute of Forest Genetics at Placerville, California, and ten of new hybrid Rhododendrons (chiefly crosses between the native *Rhododendron maximum* and the best modern hybrids) from Dr. C. G. Bowers of New York. Both of these two latter groups have germinated well.

(b) Plants

Among the more interesting recent acquisitions have been the following: a collection of ten new Azalea varieties, usually three plants of each, from the Knap Hill Nursery in England, given us by the Seattle Garden Club for Azalea Way; twenty Rhododendrons of several species from Mr. Lester Brandt of Tacoma, a frequent donor to the Arboretum collections; twelve varieties of Roses, chiefly species, with some of the old-fashioned kinds purchased from another English nursery (T. Hilling & Co.); a collection of twenty forms of the Western *Juniperus scopulorum* acquired from nurseries in the Rocky Mountain region or east of it; scions of seven forms of the Black Locust from the Morton Arboretum near Chicago; young plants of seven kinds of Crabapples, totaling twelve plants, from the Arnold Arboretum near Boston, and a small parcel of seedling Embothriums, *Nothofagus obliqua,* and some hybrids of the uncommon *Azalea Oldhamii* from another English source. Many other equally welcome lesser gifts of plants have also been received, too numerous to mention here, as is also the case with seeds.

(c) Books

Outstanding among the acquisitions to the library have been the fourteen early volumes of the beautifully illustrated "Botanical Magazine" (1793-99) and five volumes of the "Botanical Register" (1840-44), the gift of Mr. Cebert Baillargeon, to which we hope gradually to add during future years. Other books acquired include the following: "Farrer's Last Journey," by E. H. M. Cox (1926); "Forest Flora for the Punjab," by R. N. Parker (1918); "Eucalypts in New Zealand," by J. H. Simmonds (1947), and "Practical Lawncraft" by R. B. Dawson, revised edition (1949).

(d) Equipment

The only items to be mentioned under this heading are a rain gauge to add to our meteorological information, and four humidity indicators for the greenhouses.

Distributed

During April and early May it has been possible to dispose of surplus plants of Rhododendrons to the following places, one or two truck loads to each, for use in their ornamental planting schemes: The Police Rehabilitation Center, Seattle Public Schools, Firland Sanatorium, and to the Campus of the University of Washington, which received more than 200 plants. These have been plants raised from seeds some ten years ago which we now find too numerous for our own plantings. We were also able to supply good plants of nine Rhododendron species, totaling fifty plants, to the State Parks and Recreation Commission; these were at once distributed and planted in eight of the state parks in Western Washington. Collections of surplus young plants of varied kinds have been sent to the Arnold, Morris, Morton, and Los Angeles County Arboreta, among other destinations, in exchange for their past kindness to us. Surplus plants of *Rosa* species have been given to the Bremerton Rose Society for planting along roadsides in the neighborhood of that city. As usual, a mixed collection of plants was sent to the annual plant sale for the Children's Orthopedic Hospital during April. More than seventy collections of seeds have been sent out in exchange with other similar institutions all over the world, and numerous lesser amounts to park superintendents, nurserymen and private individuals who have also cooperated with us in this way.

Staff

Our former secretary, Mrs. Dorothy Barton, resigned at the end of February and was replaced in the office by Miss Maryann Fleetwood. In the Arboretum two additional men were added in mid-March, one of whom had had previous experience at the Missouri Botanical Garden and Arboretum near St. Louis, the other in nurseries in New York and elsewhere.

The work of the whole staff this spring has been excellent and outstanding in its teamwork. A great deal has been accomplished both in general maintenance, minor improvements in certain areas, repairs to equipment, planting on a large scale, handling of young plants in the greenhouses, recording and secretarial work, and while all have done their full share, the direction of work by the foreman, Earl Brown, is certainly deserving of special commendation for the results achieved.

Donations

As well as those already mentioned, we have received $200 from the energetic West Seattle Garden Club for plants in Woodland Garden; $15 from Magnolia Garden Club, Unit No. 4, for plants; from Kenmore Garden Club, $10, and from Mr. Oliver Ester, $14. All these are most welcome for their specific purposes, since the present budget and other income of the Arboretum is by no means sufficient to allow us to do all that we wish to, or could do were more funds available.

Public Relations

For some time the need for a building or room in the Arboretum where garden clubs and other groups could meet throughout the year has been growing. This want is now in process of being filled, through the recent acquisition of a temporary wooden building, about 52 feet by 24 feet, from the University Campus, placed conveniently near the Arboretum offices. When the essential services have been added, with a small kitchen at one end, it will undoubtedly prove a very useful and popular meeting place for groups of up

(Continued on Page Thirty-four)

Archibald Menzies, 1754-1842
Botanist - Surgeon - Explorer

Mrs. Hilda Swift*

THIS Northwest corner of the Pacific, after passages about the southern continent were found and the earth circumnavigated, early came into prominence as a possible entrance to a passage round the North American continent. It was on the return from an exploring and pillaging expedition that Sir Francis Drake came, so he said, to the 48 degree north latitude, hoping to find a shorter and safer route back to England with his priceless cargo of plunder.

A period of wars followed soon after, which occupied the attention of Spain, Holland, England and France so completely that for some time little more was done in exploration and colonies started were left to their own devices. It was about a hundred years later that nations once more took up exploration. This time the idea of new markets and new products that would help the home economic situation was added to that of more territory. With a revival of trade a short way home would be invaluable and Captain Cook was therefore commissioned by the British government to search for a northwest passage. Though Captain Cook was unable to find the passage, he did give a great stimulus to trade by finding fur. The natives of the Northwest were so eager for metal and cloth that even sea otter skins went for bits of copper and iron. China paid high prices for fur and in return, tea and spices paid well in the home market. Private enterprise built and outfitted clipper ships, fortunes were made quickly and everywhere adventure was in the air.

Russia must have been aware of the widening horizons of other nations, for Peter the Great ordered Bering to cross Russia and sail from Kamchatka to the opposite coast, which coast he was to follow till he should come upon European ships. From them he was ordered to find out where the American coast began, inquire the name of the coast where he then was, chart it and return. In 1728 the ships left Kamchatka in an attempt to carry out these orders.

It was into such an awakening world that Archibald Menzies was born March 15, 1754. Castle Menzies, which is about four miles from Aberfeldy, Perthshire, Scotland, furnished most of the young Menzies clan their first lessons in gardening and botany. Archibald was no exception in this regard. Going on to Edinburgh later, he studied botany under the famous teacher and botanist, Dr. John Hope, and graduated with degrees in both botany and medicine. A letter of introduction from Dr. Hope to Sir Joseph Banks, who was in charge of Kew Gardens at the time, opened the way for Menzies to meet many of the great botanists of the period, and Kew later became the recipient of many of the seeds and plants he collected.

Menzies' first assignment after graduating in medicine was as surgeon in the navy and his station Halifax. Here, in his spare time, he collected and familiarized himself with vegetation on the western side of the Atlantic. Upon returning from Nova Scotia, Menzies heard of a round-the-world fur and exploration trip, sponsored by private enterprise, about to sail to the North Pacific.

The expedition, with Captain Colnett in command, proved very valuable. Seeds, plants and drawings were dispatched to England along with dried specimens and careful notes. Unfortunately for material gathered later, when the ships sailed into Nootka in 1789, war with Spain was in progress and the Spaniards, who happened to be in the harbor, boarded the English vessels, confiscated the captain's papers and all of Menzies' botanical specimens, records and drawings. Plants given the name of Nootka were seen first on this expedition—*Rosa nutkana, Chamaecyparis*

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*Starting with "Menzies" we are happy to present our first in a series of articles on Early Plant Explorers of the Pacific Northwest, and Mrs. Hilda Swift, well-known in Seattle as an ardent gardener, as its author.

nootkatensis (Alaska Cypress), *Lupinus nootkatensis.* At this time Sir J. E. Smith, head of the Linnean Society, described and named many of the specimens he had received from the early part of Menzies' trip. *Araucaria imbricata* (Chile pine), *Ribes sanguineum,* (flowering red currant) and *Rubus nutkanus* (Raspberry) were but a few of those named.

The fur cargo Captain Colnett had collected was sold next spring in China and tea and spice reloaded for England, but love of adventure must have become a prime necessity, for scarcely had Menzies landed in England before he was applying for a return trip. The British government was sending Captain Vancouver to receive back the territories lost to the Spanish by the recent war, and to make an accurate survey of the coast from the 30 degree north latitude, northwestward toward Cook's River. A fulltime naturalist was being sent along and Menzies was given the post.

Lord Grenville, who was Secretary of State at the time, asked Sir Joseph Banks to formulate the instructions, stating very explicitly what the government desired of its naturalist. The scope of these desires would have dumbfounded most scientists of today, for he was to gather information on plants, soil, water, waterways, minerals, animals, furs and fish, with special attention to be given to the life cycle and habits of the sea otter. All dried specimens and other material gathered were to be turned over to His Majesty's Secretary of State on the termination of the trip. When a copy of Menzies' instructions was sent to the Lords Commissioners of the Admiralty in 1791, Lord Grenville added that the commander of the ship must give every assistance to the naturalist as "his work is connected with some of the most important objects of the expedition."

Vancouver touched Australia and New Zealand, then headed for the North Pacific to fulfill the first part of his mission. Having to wait for further instructions before being able to settle with the Spanish, the survey of the coast was started and Menzies was again collecting plants, making sketches and notes. It is interesting to know what sight greeted our naturalist when he stepped ashore that May day so long ago. On Page 18 of Menzies' Journal, dated May 1, 1792, he writes: "We found on landing that vegetation had already made great progress, the shore was skirted with long grass and a variety of wild flowers in full bloom, but what chiefly dazzled our eyes on this occasion was a small species of wild Valerian with reddish colored flowers growing behind the beach in large thick patches." In a paragraph soon after he continues with the first description of trees in this area. "Besides a variety of Pinus we here saw the Sycamore Maple—the American Aldar and the Oriental Strawberry Tree; this last grows to a small tree and at this time a peculiar ornament to the Forest by its large clusters of whitish flowers and evergreen leaves, but its peculiar smooth bark of a reddish brown color will at all times attract the notice of the most superficial observer." Menzies goes on to make a generalized description of climate, waterways and the mountains. On Page 49 he further describes "the Woods here (Admiralty Inlet) were chiefly composed of Silver Firs, White Spruce, Norway Spruce and Hemlock Spruce together with the American Arbor Vitae and common Yew, and besides these we saw a variety of hardwood scattered along the Bank of the Arms, such as Oak, the Sycamore or great Maple, Sugar Maple, Mountain Maple and Pennsylvania Maple—the Tacamahac and Canadian Poplars, the American Ash, common Hazel, American Aldar, common Willow and the Oriental Arbute but none of their hardwood trees were in great abundance, or acquired sufficient size to be of any great utility except the Oak in some particular places as at Port Gardner and Oak Cove. We also met here pretty frequent in the woods with that beautiful Native of the Levant, the purple Rhododendron, together with the great flowered Dogwood, common Dogwood and Canadian Dogwood, the Caroline Rose and Dog Rose, but most part of the shrubs and undergrowth were new and undescribed; several of them I named as *Arbutus glauca, Vaccinium lucidum, Vaccinium tetrag-*

(Continued on Page Twenty-nine)

Woodland Garden—1938

MRS. W. W. SAWYER*

WOODLAND GARDEN came into being in 1938. In May of that year, the West Seattle Garden Club voted to develop an area in the Arboretum (as many other clubs were doing) to be planted to Cornus (Dogwood) varieties. Mrs. Loren Munson and I were appointed a committee to choose the site.

It was a lovely May morning when Mabel Munson and I, with lunch in hand, started our tour of the Arboretum area. We found it a very pleasant task.

Mr. Fred Leissler, acting director at the time, gave us a map of the grounds with all locations marked that had been taken. I had known Mr. Leissler when he was on the Park Board and worked with him in Girl Scout programs, so it was a very pleasant contact again. We found him most cooperative and when at the end of the day we had discovered no suitable spot, he suggested we come back and he would go with us on our next trip.

It wasn't as easy to find a fitting place for Dogwoods as it would have been for most any other genera of plants, for certain Dogwoods require a dry, well-drained situation while others need a swampy area. A few days later we were back at the Arboretum and, as Mr. Leissler was busy, we started on our hunting expedition again, he to join us later.

Just before noon we came upon a hillside sloping down to a marshy lowland and we at once thought it might be developed into just what we wanted. We hurried back to the office and Mr. Leissler. After eating our lunch, the three of us started for our discovery. Upon seeing it he heartily agreed it could be made into a beautiful area and made a grand suggestion. He said to call it a Woodland Garden instead of a Dogwood collection. In it we could have our Dogwoods and also all of our lovely natives. We liked the idea very much. The marsh could be dredged, he said, and many huge boulders we had seen on our travels through the grounds could be brought in and placed beside and in the stream. We were thrilled by the thought and as we left for home that afternoon, we really felt as if we had accomplished something.

In our mind's eye we could see a lovely woodland planting, a clear flowing stream with rocks and pools and a hillside covered with our own delightful natives.

Now It Is a Reality

This tract of two acres is a narrow strip of land about 500 feet long lying at right angles to Azalea Way, at about the middle of the Arboretum and extending to the upper road just north of the Magnolia collection. Shady for the most part, it emerges here and there into full sunshine. The soil is rich and moist, ideal for those shade-loving and shade-tolerant plants which include within their group many of the world's loveliest.

We now had the site. Next we wanted it landscaped. We had little money but wanted the best, so we turned to our good friend, the late Mr. Fabi. We went over to see him and he later met us at the Arboretum and inspected the plot. He approved most heartily of our choice and said it could be developed into a "Charming Garden."

When we approached him about landscape plans, he said that if I would spend a day with him he would draw them up. Lucky me. I felt it a privilege and honor to work with him and spent a very happy and profitable day working on the plans, which were later carried out with some modifications: dredging the swamp and widening the stream in places to make a series of pools and cascades, with places for rustic bridges.

This delightful area is being developed from Mr. Fabi's plan as a beautiful naturalistic valley and is featuring certain herbaceous plant groups, small trees and shrubs which grow and flower best under light woodland conditions.

(Continued on Page Thirty-three)

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*Mrs. W. W. Sawyer, long-time member of the Arboretum Foundation and of the West Seattle Garden Club, was their unanimous choice to bring us the history of Woodland Garden, the delightful spot in the Arboretum sponsored by the Club.

Woodland Garden—1950

ROBERT J. HANSEN*

WOODLAND GARDEN'S layout, as originally planned with the pools and meandering stream, could not be improved upon. The area is ideal as a homesite for plants which prefer a wooded setting as could be desired.

The actual need since the war years has been for a plan which considers the placing of the trees and shrubs in appropriate groupings according to their natural habitat or for the display of their best virtues. The wild flowers and bulbs will establish themselves better when the shrubby upper story has developed to provide suitable cover.

The existing tree groupings were studied carefully, looking into their future status. Some groups, especially the conifers, had to be complemented with young trees to carry on for future generations. Others, like the native Willows, have been removed to give place for choicer trees. Some of the large native Maples were removed when found to be usurping too much space or were too crowded. Additional trails have been provided so that one may make a first-hand acquaintance with the various plants. Benches will be placed where one may overlook views through the plantings or find a restful spot to enjoy the woodland atmosphere.

The many charming native trees and shrubs of Washington State were given first consideration to make a truly representative woodland planting. Here will be found a background of our Fir, Hemlock, Arborvitae, Madrona, Oregon Maple, Vine Maple, Dogwood and Cascara. Masses of Salal, low Cascade Mahonia, Huckleberry, Western Azalea and *Arctostaphylos* in pleasing groupings will predominate. Here is one place where our native shrubs of good garden character take first place. We never pass them by, let alone kick them aside, for we appreciate them for their real beauty. We find many of these far surpass the usual run of shrubs imported from other countries.

The goal in mind in selecting the plantings was to achieve a bit of beauty the year around. Whether it be in flower or fruit, bud or foliage, or texture or form, there will be some interest at every season.

This means, in addition to the use of our native shrubs, a selection of the best other ornamental shrubs which enjoy the woodland setting and provide a special beauty at the various seasons.

Where could we turn more appropriately for fellow companion plants than to the Eastern areas of the United States? The rich flora of this section contributes many plant jewels to our setting.

Two Eastern trees, the Sweetgum, *Liquidambar styraciflua,* and Black Tupelo, *Nyssa sylvatica,* appreciate the damp situation along the pools and stream.

The choice of Eastern shrubs is legion, yet probably one of the most outstanding of these is Mountain Laurel, *Kalmia latifolia.* Other shrubs such as the Sumac family, including the Flameleaf and Smooth Sumac, in the larger forms, with the low Fragrant Sumac, have a special spot on the dry hillside.

Three well-known Eastern Azaleas used are Pinxterbloom Azalea, *Rhododendron nudiflorum,* Pinkshell Azalea, *Rhododendron Vaseyi* and Swamp Azalea, *R. viscosum.* The latter continues the bloom into July and is found along the base of the slope of the west pool in combination with our fragrant western Azaleas.

The Viburnum family is generous with many worthy species. They are handsome in flower, foliage and fruit. Those used from America include *Viburnum cassinoides,* the Witherod, noted for its picture of changing color of fruits. One may see all stages of change from green to pure pink to blue-black

(Continued on Page Thirty-two)

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*Mr. Robert J. Hansen is Assistant Director of the Arboretum.

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Woodland Garden—1938 *(upper)*
Woodland Garden—1950 *(lower)*
—PHOTOS BY E. F. MARTEN

Late Summer Flowering Shrubs

Bryan Taylor

TOWARDS the end of June there is a noticeable lull in the flowering shrub garden. The pause is due to the fact that the early summer ones are coming to an end and their place is not yet taken by those species which grow their flowering wood in the current year.

From July onwards the list of good flowering shrubs becomes restricted in choice. However, the happy hunter for these late summer flowering shrubs will find that they have one point in common, namely that almost all flower on the new wood of the current season's growth, and therefore should be pruned in March. Examples of this are *Spiraea japonica* var. "Anthony Waterer" and *Ceanothus* "Gloire de Versailles," both of which have the previous year's wood cut back, in March, to within two to three eyes of the older wood.

Time of flowering might seem to be the more informative way of listing the shrubs but, since a number of them flower from July till the first frosts, that becomes a cumbersome method, and so I have decided to arrange it by colors, also including the approximate height and spread of each. This size can only be approximate as growth depends so much on position, soil and care.

For the milder climates, such as our West Coast, the Eucryphias will give a splendid display of white during August and September. The best of them is *E. nymansensis (E. glutinosa* x *E. cordifolia),* practically evergreen, of lusty vigor and incomparable beauty, fairly fast-growing, making a small tree of 25 ft. by 10 ft. Clear white Hypericum-like flowers with a mass of terra-cotta stamens. *E. glutinosa,* deciduous, is slower growing and bears large white flowers with golden stamens; its foliage is magnificently tinted in the fall.

Stewartia Malacodendron, still a rare shrub, is the best of the species, growing up to 10 or 12 ft. In July and August it is one of the finest shrubs that we have, with large silky white flowers 3 inches across, sometimes streaked with crimson at the base, with a mass of purple stamens. Almost does it give the impression of large single roses. It must have a moist peaty soil with the roots shaded from the sun.

The hardiest of the Olearias is *O. Haastii,* which delights both eye and nose with masses of white daisy-like flowers, Hawthorn scented in July and August. Makes a well-shaped, small, 5 ft. by 4 ft. evergreen shrub and is useful in that it is happy in a sunny, sandy soil.

A vigorous shrub, *Clerodendron Fargesii,* serves a dual role by bearing clusters of white, fragrant, star-shaped flowers from July to September followed by exquisite small pale blue berries set in pink calyces. Requires room, 8 ft. by 5 ft., but is attractive throughout the season—the young foliage being reddish purple gradually turning to glossy green.

Zenobia pulverulenta is a small shrub, 3 ft. by 3 ft., for half shade in a peaty soil. Not only are the white dusted leaves attractive, but in July its long sprays of white bells, half an inch across, are pleasantly reminiscent of lily-of-the-valley.

New Zealand supplies us with the Hoherias, all of them of great value in mild climates. *H. Lyallii* is one of the finest flowering plants, growing to 12 ft. by 9 ft. Deciduous, grey-green leaves covered with fine down, blooming in July with masses of extremely graceful white cherry-like flowers with golden stamens. *H. glabrata* is similar, but with yellowish-green leaves and is more vigorous and faster growing and prefers wetter places than the first. *H. sexstylosa* is an evergreen, very fast growing—20 ft. in six to seven years. The white flowers, borne in August, have six pink styles. Tender, but a beauty.

The Snowdrop Tree, *Styrax japonica,* is a splendid small tree of 15 to 20 ft. The graceful, pendent, five-petalled, white flowers are carried on the ends of side shoots in vast numbers in July. Plant where the sun's rays do not hit it early and beside a path where you can look up into it.

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*Mr. Bryan Taylor, Seattle nurseryman and member of the Editorial Board, whose comments on any garden topic are of great interest, brings us another of his discussions on a very timely topic.

One Rhododendron must be mentioned to round off the white section and that is "Polar Bear," a hybrid of *R. auriculatum* x *R. diaprepes*. Flowering in August it is a welcome arrival to the Rhododendron lists.

To start the yellows *Spartium junceum,* the Spanish Broom, must have pride of place. One of the longest, June to September, and most free flowering of the later shrubs it makes a magnificent specimen, 8 ft. by 8 ft., with care. The thin twigs must be sheared back in early spring and then the long sprays of clear yellow, pea-shaped, extremely fragrant flowers will give a lasting late summer display, but must have poor soil and sunny site.

Genista cinerea is another attractive broom —provided that you get *G. cinerea* and not the straggly *G. virgata* with which it is often confused. The best forms of *G. cinerea* will form a pleasant little mop-headed tree 6 ft. by 4 ft. laden with bright yellow flowers from July to September, but again poor soil and sun.

Yet another shrub that demands poor soil and sun, preferably a south wall, is *Fremontia californica*. Partially evergreen, growing to 8 ft. by 6 ft., this Californian blooms merrily through June to October bearing large five-petalled 2-inch yellow flowers. They hate root disturbance but when happy are among the most beautiful flowering shrubs.

Potentilla fruticosa var. *Farreri* is a delightful wee shrub, 2 ft. by 3 ft., which pleases from June to September. Dwarf and compact habit with flat, small yellow flowers during the whole season.

A silver-leaved, small shrub, 3 ft. by 3 ft., *Senecio laxifolius,* is the best of a genus that contains a number of attractive plants and a host of undesirable weeds. Its yellow daisy-like flowers bloom from July to September.

Hypericum "Rowallane Hybrid" *(H. Leschenaulti* x *H. Rogersi)* is a better garden plant than either of its parents. It is bushy, 6 ft. by 4 ft., extremely free-flowering — even at Christmas, in mild winters, there will be perfect flowers. The 3-inch, cup-shaped flowers are an intense golden yellow which does not bleach in the sun.

Two late-flowering yellow *Clematis* must be included. *C. tangutica* is still the best of the yellows in spite of competitors. From June to late Autumn it is spangled with deep yellow, fragrant Chinese lanterns ageing to silvery heads of silky seeds, which please as much as the flowers; *C. orientalis* is similar but not as good. *C. Rehderiana (nutans)* is almost as attractive and is a remarkably vigorous climber which, if cut to the ground every February, will still reach 20 ft. in a year. The large clusters of small bell-shaped flowers of primrose-yellow are produced from July to October, and have a primrose-like fragrance.

The *Ceanothus* form the backbone of the blue late summer shrubs. *C.* "Gloire de Versailles" has large sprays of deep powder-blue flowers from July to October and grows to 6 ft. by 4 ft. *C. Burkwoodi* is more vigorous, 7 ft. by 9 ft., with small evergreen leaves and dense sprays of bright blue flowers borne in the leaf axils of the current year's growth, from July to October. *C.* "Autumnal Blue," a hardy evergreen hybrid of *C. thyrsiflorus,* with flowers of light blue, is very persistent in flowering, and *C.* "A. T. Johnson," another evergreen, with Wedgewood-blue flowers, breaks into flower twice, in summer and again in autumn, both efforts being startling and extremely attractive.

Hydrangeas provide enough material for several articles on their own but there is one that must be mentioned here and that is the delightful *H. Sargentiana*. This magnificent shrub, making a bush of 8 ft. by 8 ft., blooms from July to September. The large, rough, velvet-furred leaves and furry shoots help to set off the flat heads of lilac-pink, fertile flowers, surrounded completely by the larger, sterile white flowers. Looks straggly in the open so cover its bare legs with lower-growing shrubs.

A good edging or low hedge plant is the little evergreen *Hebe (Veronica) elliptica* var. "Autumn Glory." Growing only to 2 ft. by 2 ft., it has the largest flowers of any of the species, violet-blue, in clusters of up to twelve, and blooms from July to September.

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Conifers on the West Coast of Scotland

J. Alan B. Macdonald

THERE are few districts in Scotland and especially on the western side of that country which would not be much poorer aesthetically, and economically also, if conifers native of the American Pacific Coast had never been introduced. One wonders just how much visitors from America, many of them G. I.'s who sailed into the Clyde during the war and toured or were stationed in the neighborhood, were surprised to find the woods and gardens thereabouts full of species they had known back home in Washington or even in California. It is not difficult, however, to account for the great interest taken during the 19th century by Scots gardeners and foresters in Western American species, when one remembers that several famous botanists and explorers hailed from Scotland; the two most important were, of course, Archibald Menzies, born in 1754, and David Douglas, born in 1798—both hailed from villages in Perthshire.

So far as the more favorable sites in our young national forests are concerned, and there are many new forests in Western Scotland, considerable areas have been established by the successful planting of Sitka spruce and Douglas fir. It is usual in these forests to restrict Sitka spruce to fresh but frost-free slopes, and to employ Douglas fir on rather better, deeper and less moist soils in sheltered localities. Both species exceed greatly in rate of growth that of the common European species such as Norway spruce and Scots pine so that their contribution to the timber productivity of the region is likely to be a very important one. The Forestry Commission has had several sample plots in both species on the west of Scotland, but windfall and war fellings have reduced this number seriously. One of the fastest growing Sitka spruce stands in Great Britain was located at Dunach estate near Oban in Argyllshire. This remarkable stand produced 9530 cubic feet at 40 years. Among the Douglas fir sample plots in West Scotland another Argyllshire one (Benmore) on a steep, rocky, north-facing slope now averages 116 feet high at 70 years old and has to date produced 10,000 cubic feet of timber under bark. On poor moorland sites, one Western American conifer stands out above all others—this is *Pinus contorta;* its coastal type makes a remarkably good windbreak while certain more inland races of the same pine show promise of producing fine, straight poles which may be valuable for transmission lines.

In addition to these three species which are being planted extensively in the new forests in Scotland several other Western American conifers are to be found growing well although they are not yet used extensively. Among these are the Grand and Noble silver firs, for instance, which make very rapid growth on reasonably good and well-drained soils. Incidentally, a recently established sample plot of *Abies procera* (also at Benmore) showed higher volume production per acre than either Douglas fir or Sitka spruce; at 26 years of age the volume was 2913 cubic feet. Then there are in West Scotland plantations of hemlock *(Tsuga heterophylla)* and a few nice little stands of western red cedar *(Thuya plicata)* although frost and the disease *Keithia thuyina* are troublesome. Lawson cypress is also to be found. In addition there are occasional groups of *Sequoiadendron giganteum (Sequoia Wellingtonia);* but *Sequoia sempervirens* is more rarely found.

All these species are, however, more common in grounds around castles and mansion houses than in the actual woods. So far as well-established old trees are concerned there is probably no estate in Western Scotland with a better selection of the Western American conifers than "Benmore" which lies near the the shores of the Holy Loch, a small inlet within the Clyde estuary. A very special feature of the policies at Benmore is the fine avenue of giant sequoia which lead from the lodge gates to the house. These trees are over 100 feet high and are remarkably uniform. Among other well-grown Western American conifers in the grounds are: *Abies concolor, Abies Lowiana, Abies procera, Abies grandis, Picea sitchensis, Pseudotsuga taxifolia, Tsuga heterophylla, Thuya plicata* and *Sequoia sempervirens.* It is interesting to find in the grounds at Benmore that many of the above named American conifers have regenerated freely. A forest garden near Benmore where it is hoped to make a very full collection of all timber-producing trees was commenced before the war by the Forestry Commission and is now being developed.

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Other famous collections of conifers still exist on various estates down the whole length of Scotland's west coast from Gareloch in Ross-shire to Monreith in Wigtownshire. Both Cumlodden and Stonefield on the shores of Loch Fyne have excellent collections of conifers. The Cumlodden one is perhaps the more complete but it is much younger than that at Stonefield. Then on the same sea-loch interesting collections exist at Inverary Castle—the seat of the Duke of Argyll—and at Ardkinglas. Portalloch Estate also in Argyllshire and not far west of Loch Fyne has some fine conifers from Western North America and from other parts of the globe. So has Rossdhu on the western side of Loch Lomond, and Buchanan Castle, home of the Duke of Montrose at the southeastern end of that loch. Other west-of-Scotland estates where fine examples of Western American conifers are to be found are Dolphinton House in Lanarkshire, Blairquhan Castle in Ayrshire, Culzean Castle—General Eisenhower's *pied á terre* in the same county, Glenapp, Kelburn and Kilkennan, also in Ayrshire. Passing still further to the south, in Dumfriesshire the more important collections belong to the Duke of Buccleuch at Drumlanrig and at Langholm and to Sir John Buchanan-Jardine at Castle Milk. The County of Kirkcudbright also has some famous forestry estates where American conifers grow well, such as Kirkennan and Munches, both near Dalbeattie. Finally in Wigtownshire, Scotland's southwestern extremity, the Earl of Stair has a specially important range of conifers at Castle Kennedy and there is an equally famous collection made by the late Sir Herbert Maxwell, Bart., F.R.S., at Monreith. When the last careful examination of the conifers on these estates was made for the Conifer Conference some 20 years ago many of the Abies, Douglas fir, Sitka spruce and hemlock were at least 60 years old and had reached 100 feet in height. One Sitka spruce aged 55 years at Inverary Castle was 120 feet high, but a common European silver fir *(Abies alba)* believed to be 250 years old was 168 feet high and girthed over 20 feet, five feet above ground level. The tallest Western American silver fir was a *procera,* age unknown, at Stonefield, which had reached 135 feet high. A *Thuya plicata* nearby but in a deep and sheltered valley was 132 feet high. It is most unlikely that either of these trees was over 70 years of age.

As an example of what can be done with conifers on the higher and poorer moorlands no estate is more important than Corrour owned by Sir John Stirling Maxwell. Corrour is a famous deer forest situated at the northwestern edge of the Moor of Rannoch. Here the enterprising owner has enclosed many hundreds of acres and has planted extensively on the moorlands at altitudes ranging from 1300 to 1600 feet. More use has been made of Sitka spruce than of any other single tree, but among other conifers from Western America which are making promising growth at Corrour are the following:

Abies grandis, Abies procera, Tsuga heterophylla, Thuya plicata, Abies amabilis, Abies lasiocarpa, and var. *arizonica, Abies Lowiana, Chamaecyparis Lawsoniana, Chamaecyparis nootkatensis, Larix occidentalis, Libocedrus decurrens, Picea albertiana, Picea albertiana* var. *conica, Picea Breweriana, Picea Engelmanni, Picea pungens, Picea sitchensis, Pinus contorta, Pinus contorta* var. *latifolia, Sequoiadendron giganteum, Thuya occidentalis.*

No conifers from eastern or southern districts of America are at all important in Western Scotland. White spruce, black spruce, red spruce, Balsam silver fir, Banks' pine, *Tsuga*

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Yellow Mottle Leaf, a Virus Disease of Camellias*

J. A. Milbrath and F. P. McWhorter

YELLOW variegation of foliage is widespread in many varieties of camellias. This discoloration has been assumed to be a natural or genetic variegation comparable to the yellow and white variegation common in many other types of plants. Such variegations may originate during seed formation and appear in the seedlings, but they begin more frequently as bud sports. Thus one may find branches with variegated leaves on plants having otherwise only normal green foliage.

Experimental work has shown that this chlorosis or variegation in plants can be due either to a definite genetic character or to a virus. When caused by a virus, the variegation is evidence of a disease often called infectious chlorosis. The genetic type is a fixed character within the plant cells and cannot be transferred from one variety to another. The virus type, being of a disease nature, can pass from one variety to another when healthy cells are exposed to diseased cells in close organic union. Thus during grafting or budding the infectious virus can pass from the diseased cells into the healthy and initiate a disease that appears as a variegation. True genetic leaf variegations usually follow a uniform and typical pattern which is similar or apparently identical on every leaf. A narrow golden or white stripe along the margin of each leaf is a common type. The chlorotic patterns caused by virus are less regular and may vary from plant to plant or even among individual leaves on the same plant.

The yellow variegation or the yellow leaf spotting in camellias is mostly of the virus type. This has been demonstrated by grafting portions of named camellias with various types of spotted foliage on the stems of camellia seedlings with normal green foliage. The subsequent foliage developed by the seedling is not green but is disfigured by various patterns of yellow chlorosis. Likewise, the normal green foliage of named varieties has been changed to spotted and variegated foliage by placing a scion from camellias showing the spotted foliage onto such plants.

Grafting and budding tests have shown that any yellow blotching of camellia foliage is likely to be caused by a virus . . . There are so many variations in the patterns apparent on diseased leaves that it would be useless to try to describe them. The significant point to remember is that, unless a plant continues to form dark green foliage free from any form of yellow or yellow-white blotching, it may be assumed that the plant is diseased with virus.

This virus relationship undoubtedly explains why camellia propagators are often surprised to find that at times when they graft a solid green variety on roots developed as cuttings from some other variety, the new growth from the scion may develop mottled or variegated leaves. It may also explain some of the abnormal flower changes that are obtained when a plant of one color is grafted onto another. It should not be inferred that all mottled or marbled camellia flowers are caused by a virus. Many of these are due to a true genetic character. However, in other types of plants, it is not uncommon for a virus to cause a break in flower color. The Rembrandt tulips are classical examples of this. Further investigation is needed to clarify the relation of variegated foliage to broken or mottled flowers in camellias.

The virus does not seem to greatly affect the growth or vigor of the camellia plant. The chlorotic leaves are unsightly and are more susceptible to sunburn and frost injury. Variegated camellia plants are obviously inferior to those with the delightful green foliage characteristic of camellia.

There is no known cure for this disease, and its control will be difficult. The immediate problem is for nurserymen to develop virus-

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*Reprinted from the American Camellia Yearbook 1946 of the American Camellia Society, Gainesville, Florida, with the permission of one of the authors, Dr. J. A. Milbrath, Plant Pathologist, Oregon State College, Corvallis, Oregon.

The Santa Barbara Botanic Garden

KATHERINE K. MULLER*

ON a sunny Sunday in spring the steady stream of cars along Mission Canyon Road is indication that Santa Barbarans and their out-of-town guests are again enjoying the magnificent displays of the Santa Barbara Botanic Garden. Located in Mission Canyon, four miles from the center of town, the Santa Barbara Botanic Garden enjoys an unique setting. To the north the canyon merges with the foothills of the Santa Ynez Mountains, chaparral-covered with a few scattered pines on their highest points. To the south the canyon walls frame a view out across the city to the Pacific Ocean and the Santa Barbara Channel Islands.

The Santa Barbara Botanic Garden was established in 1926 as a garden devoted to the study of native plants of California. Recognizing that for almost a century California plants had been much sought by British horticulturists and plantsmen, the originators of the Santa Barbara Botanic Garden felt a definite need for a garden in California which would be designed for the display and study of California natives with particular emphasis on their horticultural values. Thus in 1926 Mrs. William H. Bliss purchased the original land of the garden, a spot chosen with the advice of the late Dr. Frederic E. Clements of the Carnegie Institution of Washington, and established it as the Blaksley Botanic Garden in memory of her father. The original garden occupied the central portion of the present acreage. Additional land has been purchased since that time and in 1939 the name was changed to the Santa Barbara Botanic Garden.

The site selected is ideally suited for the development of a garden of native plants. The fifty acres which today comprise the garden occupy a cross-section of Mission Canyon. The canyon runs on a north-south axis, the west wall sloping directly down to Mission Creek, the east wall interrupted by a broad terrace of 10 acres. The chaparral vegetation which covers the rocky slopes of the Santa Ynez Range and the adjacent canyons is peculiar to Southern California and many of our finest native flowering shrubs are among its constituents. On the terrace and lower slopes of the canyon are numerous large spreading specimens of the California Live Oak, *Quercus agrifolia*. The creek banks themselves are the site of alders, sycamores, cottonwoods and willows. The plan of the garden was developed with full cognizance of the topography and the background of native plants already present. The west slope of the canyon and the creek bottom are left in their natural condition to preserve an untouched area which will serve as a sample of the original vegetation of this region and as a cover for the native wild life. The east slope is cultivated, with the administration buildings, the propagation areas and the principal plantings centered on the terrace. Informal trails winding on an easy gradient down the canyon slopes to the creek lead to all portions of the garden. One series of broad paths permits access to the cultivated areas by trucks and other heavy equipment.

Within this natural setting the Botanic Garden has been so planned that by taking advantage of the various exposures and soils, plant communities from widely diverse altitudes and latitudes have been developed. A short stroll leads from the Desert Section on a sunny exposed portion of the terrace rim to a moist cool region in the canyon floor where a redwood community is being developed. On the upper portions of the east slope a Forest Section contains native coniferous trees, particularly those of the dry ranges of Southern California. Although the bulk of the natural area is composed of chaparral vegetation, a Chaparral Section includes species not native to this immediate area.

To botanists one of the most interesting areas is the Island Section, for here are col-

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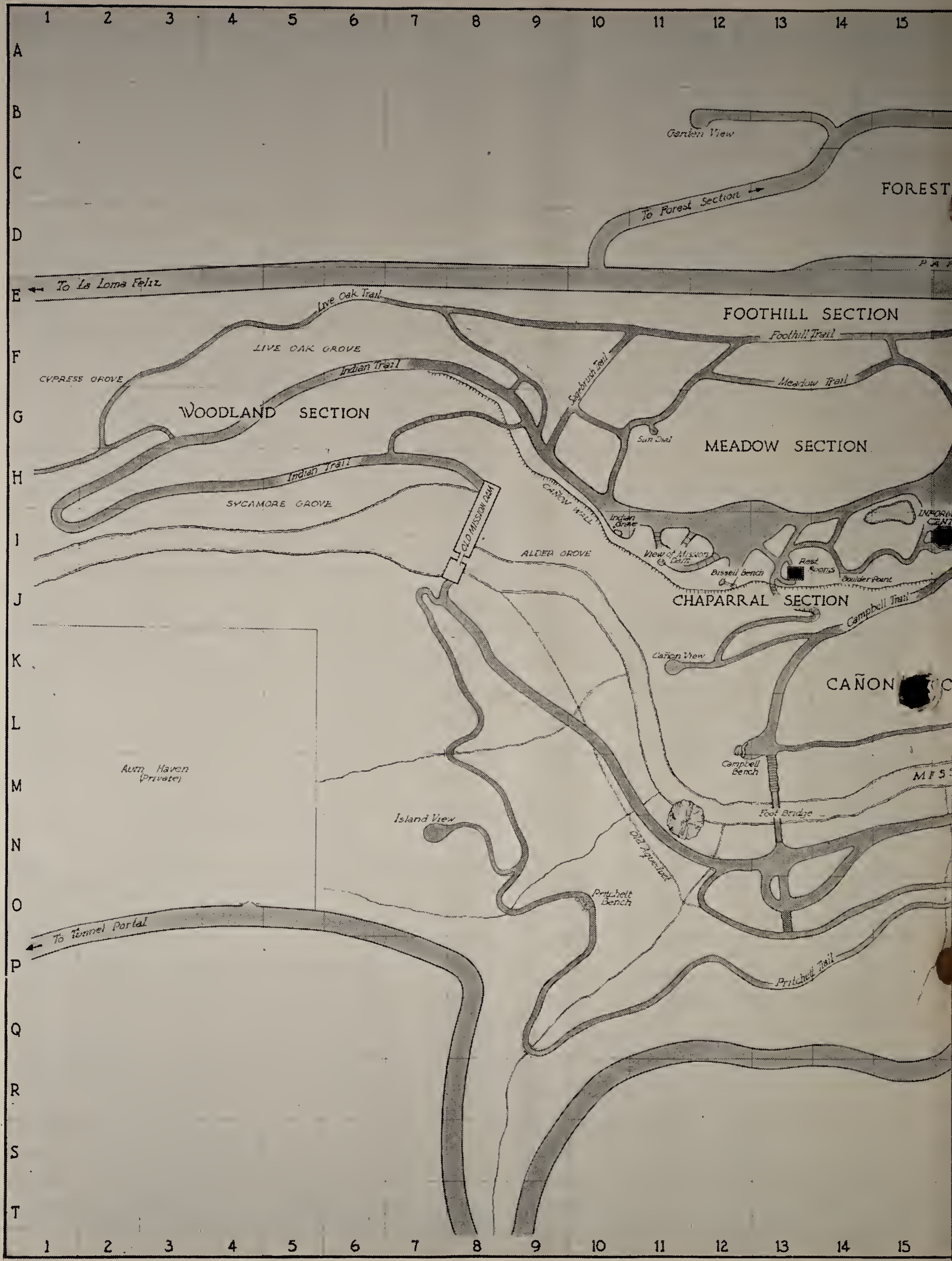
*Dr. Katherine K. Muller holds the title of Botanist on the staff of the Santa Barbara Botanical Garden and is in charge of the educational work of the organization.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A B C D E F G H I J K L M N O P Q R S T
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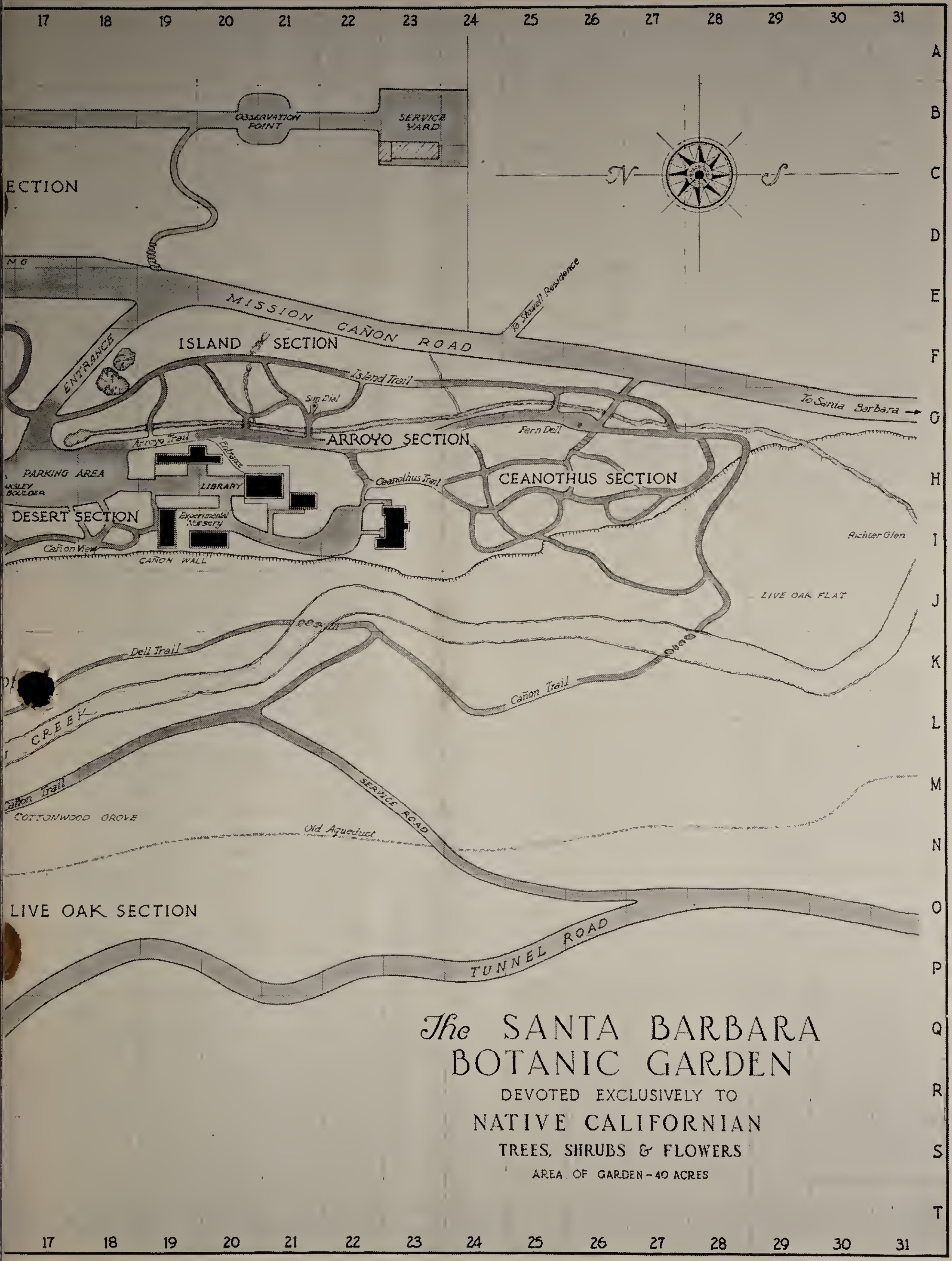
To Forest Section
FOREST
To La Loma Feliz
Live Oak Trail
FOOTHILL SECTION
Foothill Trail
Sagebrush Trail
Meadow Trail
LIVE OAK GROVE
CYPRESS GROVE
Indian Trail
WOODLAND SECTION
Sun Dial
MEADOW SECTION
Indian Trail
SYCAMORE GROVE
OLD MISSION DAM
CAÑON WALL
Indian Grave
ALDER GROVE
View of Mission Dam
Bissell Bench
Rest Rooms
Boulder Point
CHAPARRAL SECTION
Campbell Trail
Cañon View
CAÑON
Campbell Bench
Aum Haven (Private)
Island View
Foot Bridge
Old Aqueduct
Pritchett Bench
To Tunnel Portal
Pritchett Trail



The SANTA BARBARA
BOTANIC GARDEN
DEVOTED EXCLUSIVELY TO
NATIVE CALIFORNIAN
TREES, SHRUBS & FLOWERS
AREA OF GARDEN – 40 ACRES

lected only those plants which occur on the four Santa Barbara Channel Islands and Catalina Island farther south. Although the island flora contains many species in common with the mainland, it includes also numerous endemics of considerable botanical interest and horticultural value. Some of these endemics are common to the entire group; others are restricted to one individual island. Fossil records show that some of the island endemics were at one time present in the mainland flora. Among the most important horticulturally of these island endemics are Island Ironwood, *Lyonothamnus asplenifolius;* California Tree Mallow, *Lavatera assurgentiflora;* Island Bush Poppy, *Dendromecon Harfordi;* Catalina Cherry, *Prunus Lyonii;* Island Ceanothus, *Ceanothus arboreus,* and several shrubby buckwheats of which the outstanding is St. Catherine's Lace, *Eriogonum giganteum.* All of these grow well under cultivation on the mainland where they are of especial value in this dry summer climate.

The most famed and colorful section of the garden is the Strawberry Meadow, a broad plot on the east terrace which is planted to Sand Strawberry, *Fragaria chiloensis.* In March and April the large white blossoms of this native ground cover turn the meadow into a mass of white while the borders are gay with the bright colors of a mixture of California spring wildflowers. Numerous are the photographs taken of the meadow at this season by its visitors.

Various areas of the garden also serve for collections of plants of one genus regardless of origin. Most noted of these groups is the *Ceanothus* collection which is not only a display of unusual beauty in the spring, but is also the basis of the garden's extensive research on the horticultural requirements of the various members of the genus.

Research on the horticultural requirements and propagation of native plants has been a major interest of the garden since its founding. In the last several years, the research program has been expanded by a cooperative arrangement with the biology department of the University of California, Santa Barbara College. Staff members and advanced students of the college department make use of the garden herbarium, laboratory and library for taxonomic, cytological and physiological studies and conduct field research in the primitive areas of the garden's acreage.

With the development of the educational program, the three major functions of a botanic garden—display, research and education—are rounded out. Although staff members have given talks and conducted courses at various times throughout the history of the garden, no organized program of popular education has been undertaken until the past year. At the present time the educational activities of the garden include a Nature Trail, conducted field trips, talks to groups on the native flora, and courses in botanical subjects.

Publications of the Botanic Garden are varied. In addition to numerous articles by the garden staff which are published in horticultural and other journals, the garden itself publishes a leaflet series, each issue of which includes a summary of the experience of the garden in the cultivation of one particular ornamental native. Miscellaneous publications range from mimeographed pamphlets to two books, *Trees of Santa Barbara,* by Maunsell Van Rensselaer, director of the garden, and *Ceanothus,* by Van Rensselaer and Howard E. McMinn of Mills College.

The Santa Barbara Botanic Garden is incorporated under the laws of the State of California and administered by a self-perpetuating Board of Trustees. An Advisory Council consisting of horticulturists and botanists is available for consultation on particular problems which arise in their fields. In the twenty-four years of its existence the garden has had but two directors, Dr. E. J. Bissell, who from 1926 to 1936 laid the basic groundwork for the future of the garden, and Mr. Maunsell Van Rensselaer, who from 1936 to the present time has developed the garden to its present position of national recognition. The garden is maintained by private support, depending for its annual budget on memberships in the Botanic Garden Association, gifts, and the income from the endowment fund.

Crab Apples and Roses

BRIAN O. MULLIGAN

A Note on the New Arboretum Plantings

FOR the past three years a gradual process of clearing up and transformation to a greater state of usefulness has been going on in the triangular area immediately north of Lake Washington Boulevard between Miller and Roanoke Streets. This, about two and a half acres in extent, lying immediately behind the prominent line of Poplar trees *(Populus Simonii,* from North China) is part of the former city dump closed a number of years ago, and now included in the area designated for improvement as a memorial to the late Hugo Winkenwerder, Dean of the College of Forestry from 1912 to 1945.

By the end of 1949 the labor applied to this ground both by the tractor and implements in cultivation, and by hand work in raking up and removing quantities of stones, bricks, bottles and other rubbish had brought it to a fit condition to start planting. In the meantime, plants of both Crab Apples *(Malus)* and *Rosa* species and hybrids had been accumulating in the nursery, chiefly raised from seeds received 1945-1947, but some acquired by purchase from nurseries, or from other Botanic Gardens or Arboreta.

The area has been divided up into thirteen beds of irregular sizes and shapes, intersected by grass paths. Three of them, in the east corner nearest Miller Street, planted 1947-1948, contain our collection of Japanese and Chinese Quinces; the remainder are allotted entirely to the Crab Apples and Roses. Each of these two large genera has been subdivided into groups of related species, following Rehder's arrangement in his "Manual of Cultivated Trees and Shrubs" (1940). Most groups occupy one bed, but a few especially large ones *(e.g.,* Roses of the *Cinnamomeae* section) have been given two beds, and some of the smaller ones in *Rosa* share one. One species, *R. rugosa,* has been allocated an oval bed in order to display its numerous variations and hybrids.

Planting began with the Crab Apples early in March of this year. The following species and hybrids were set out, usually three plants of each where space and material permitted:

Malus aldenhamensis
— *atrosanguinea*
— *baccata* var. *himalaica*
— *coronaria*
— *Eleyi*
— *gloriosa* var. "Oekon. Echtermeyer"
M. hupehensis
— *Prattii*
— *prunifolia*
— *robusta* (planted 1948)
— *Sargentii*
— *Scheideckeri*
— *Sieboldii*
— *Zumi* var. *calocarpa*

In addition to these, plants of five varieties of the Rosybloom Crab Apples, raised in Canada from *Malus Niedzwetzkyana,* a native of Turkestan, have also been planted in their section. The total number of young trees is forty-eight.

After these had been spaced in the beds the roses could be set out. Two beds beside the service road crossing this area contain species of the large and varied *Cinnamomeae* group, one on the west side the climbing, mostly white flowered *Synstylae;* near the Boulevard we have the *Pimpinellifoliae* (including the Scots roses), and the *Caninae* (Dog roses). In the center of the whole site are the old-fashioned types, *centifolia,* Moss, Damask, China, and others in three more or less triangular beds. *R. rugosa* is located close to its relatives in the *Cinnamomeae.*

The total number of species planted thus far is forty; the plants amount to one hundred and thirty-two, with the addition of thirty others of the old-fashioned kinds, *centifolia, gallica,* Moss, hybrid perpetuals and *rugosa* varieties, kindly given us by Unit Number 3 of the Lake Washington Garden Club as the nucleus of a collection of these interesting and lovely old shrubs. In the nursery and greenhouses are other Crab Apples and Roses in various stages of growth which during the next few years will follow these first colonists to the new land. With proper care and attention we hope that within a few short years this for-

(Continued on Page Thirty-four)

The Arboretum Bulletin

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Special Notice

To keep memberships in the Arboretum Foundation in good standing, dues should be paid during the month payable. Active memberships more than three months in arrears and previously established $2 memberships more than thirty days in arrears will be dropped and THE BULLETIN will be discontinued.

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I hereby apply for membership in the Arboretum Foundation and remittance for same is enclosed to cover dues for the next succeeding 12 months.

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All memberships are non-assessable.

Notes and Comment

POPULAR order of the day at the Arboretum is the Conducted Tour over the grounds being taken by Garden Clubs and other groups. The tour appointment calendar has never known such a busy season. Practically every day in May was completely full with all tour hours scheduled. (Tours start at 9:00 or 10:00 a. m. and 1:00 or 2:00 p. m.) On May 17 a grand group of approximately one hundred garden enthusiasts made a trip from Centralia to Seattle in three chartered buses to make a tour. Though the weather was not too favorable, their buoyant appreciation was undimmed. Headed by Mrs. R. L. Alleger, president of the Northern Division of Lewis County Garden Clubs, the entire group was representative of all garden clubs in the Lewis County area.

* * *

The Editorial Board of the BULLETIN wishes to take this special opportunity to extend appreciation for much invaluable help in its preparation of the series, "Early Plant Explorers of the Pacific Northwest," to Mr. Charles Smith of the University of Washington Library for his article introducing the series in the last issue, Spring 1950, and to Mr. Roland Todd, Assistant Chief Reference Librarian at the University. At the Seattle Public Library, the Board is gratefully indebted to the splendid assistance of Miss Florence M. Waller, Technology Department; Miss Wanda Brockman and Miss Phoebe Harris of the Reference Room.

* * *

We note from a copy of the *Journal of the New York Botanical Garden* that clues on the origin of the term "green thumb" are sought. The *Journal* states that dictionaries, encyclopedias and other reference works failed to reveal the origin of "green thumb" as used so constantly in application to a natural ability for growing plants successfully. Perhaps one of our readers may send the "clue" to the Arboretum Foundation office to be forwarded to the *Journal of the New York Botanical Garden.*

If you have driven over the Upper Road in the Arboretum recently you could not help but be pleased over the great improvement in the removal of old stones and bare places along the road left with an unfinished look after resurfacing of the roads last summer. All the area has now been covered with sod.

*

The "busy pen" of our director, Mr. B. O. Mulligan, has found time not only for our own journal but recently appeared in two other publications: *Journal of the Royal Horticultural Society,* Vol. LXXV, Part 5, May 1950, "The White-Bark Pine," and "Winter Hardiness in Woody Plants and Perennials," published in the Proceedings of the Fortieth Annual Meeting of the Western Washington Horticultural Association held in December, 1949. The former is illustrated with a very fine photograph taken by Mr. Mulligan near Mt. Stuart in the Cascade Mountains, Washington.

* * *

FROST INJURY, 1950

Victoria, B. C.

In reply to our note in the Spring 1950 BULLETIN regarding frost damage in the area, we received the following from Mr. W. H. Warren, Park Administrator, Victoria, B. C.

Weather at its worst was 4 degrees F. with a 50-mile north wind accompanied by snow. Snow drifted, leaving clear, open places, causing dessication and severe frost penetration. October and November were very good growing months, the weather being probably the warmest in memory. This stimulated late growth. No hardening off was possible before the cold weather set in.

Roses were very hard hit, particularly ones which were well cared for; but even old bushes under hard conditions suffered severely where free from snow protection. Most standards were killed and many climbing varieties cut to the ground.

Viburnum Tinus (Laurustinus). Was variable in reaction. In protected places little injury was experienced, in others it was cut to the ground.

Prunus Laurocerasus (English Laurel). In Vancouver 100 per cent browning of the foliage in laurel hedges was general. Here injury was variable. Defoliation of tree forms was up to 50 per cent but all flower buds appeared to be killed. Portugal laurel injury about the same.

Dracaena indivisa. Hardy types commonly used killed outright.

Bamboos. Badly injured. Black bamboo killed to near ground level.

Eucalyptus. All types including those such as *Gunnii* generally regarded as hardy killed to the ground.

Camellias. Some browning and killing back of foliage and young wood in exposed locations.

Heathers. Erica arborea and *mediterranea* killed outright. Species like *carnea* were untouched.

Ulex (Gorse). Killed practically to ground where exposed.

Cytisus (Broom). The common type and varieties of it were severely injured in old plants but not killed outright. Species like *praecox* were untouched.

Arbutus Menziesii. Defoliated up to 100 per cent in exposed positions.

Pinus radiata (Monterey Pine). Some killed outright, other mature trees severely injured on exposed side.

Cupressus macrocarpa (Monterey Cypress). Injury severe. One year plants killed to snow line or outright. Others according to exposure. This should tend to curtail the indiscriminate use of Monterey Cypress for hedges.

Azaleas. Variable injury up to 100 per cent defoliation.

Cedrus deodara and Cedrus libani. Two 15-foot trees of the few grown in the city growing in a favorable position survived with burnt foliage. Another about 20 feet and 12-inch bole appears very severely injured if not killed. Alongside several *S. gigantea* grew with little or no injury.

Sequoia gigantea. Some browning of foliage on exposed side.

Cupressus Lawsoniana. Extremely variable, more so than any other tree. Some had no injury—others severely injured.

Araucaria araucana. No injury to slight injury.

Escallonia macrantha and microphylla. Both cut to ground.

Pyracantha Lalandi. Is only species uninjured.

Daphne odora. Defoliated.

Aucuba japonica. Little or no damage.

Euonymus Fortunei. Cut to ground.

Cydonia japonica. Some bud injury.

Helianthemum. Variable injury according to location.

Cistus ladaniferus. No injury. Other common species killed to ground.

Olearia Haasti. No injury.

Berberis stenophylla. Almost completely defoliated but no wood injury.

Berberis Darwini. Injury slightly greater than *B. stenophylla.*

Laurus nobilis (Bay Tree). One 8-inch standard noted with no injury whatever.

Magnolia grandiflora. Some foliage injury.

Arbutus Unedo. Some killed to ground.

Cupressus arizonica. Injured, but less than *C. macrocarpa.*

Cupressus sempervirens stricta. Seriously injured, the species less so.

* * *

PLEASE: Do not discard a copy of the BULLETIN. If you have no further use for yours, pass it along to a friend or return it to the Foundation. Return postage will be guaranteed.

Book Reviews

The Lily Yearbook of the Royal Horticultural Society. 1949. Price 8/6.

THIS issue of The Lily Yearbook begins with a most interesting tribute to Robert W. Wallace for his untiring efforts to promote the growth of lilies. A physician who became interested in silk worm culture, he planted thousands of mulberry trees and imported live eggs of many strains of the silk worm. It was this contact with Japan that led him to the lily and eventually into the nursery business.

An article by Dr. M. Amsler appears to be typical of many gardens and he stresses the problem of drainage in order to grow lilies successfully. The type of plants that are flourishing on certain soils will give valuable information to the experienced gardener. Moving his garden from one location to another, he encountered the drainage problem, although the soil was acid and to the liking of most lilies. The advice that is freely given by many to the effect that you can secure good drainage by digging a large hole and filling in with plenty of sand did not solve the problem. You are merely creating a sump of water. All through the entire book I found that one problem most often discussed. Sharp drainage is an essential for good lilies. Dr. Amsler's comment on many of the newer hybrid lilies is most instructive.

The entire book is beautifully illustrated with very fine clear-cut pictures, and if you were not a lily enthusiast you surely would be by the time you reached the last pages of the book.

Much valuable information may be obtained from Francis Hanger's experiences at Wisley—some types doing well in the rock garden, others planted with Rhododendrons. I think that this section of the Yearbook would probably be of greater interest to the average gardener on account of the many situations that lilies may be planted and grown successfully. He also advocates a mulching of peat moss for protection from early frosts and to promote better growth of the stem rooting varieties. The war years had taken toll of the lilies and a great deal of work was being done to further propagate the supply of existing plants. Many comments were made on Jan de Graaff's work with the new hybrid lilies. Throughout the book many other fanciers also give notes of his work.

Anyone interested in raising lilies from seed should read carefully the instructions given by Ellen K. Field. Her personal experiences on growing and propagating lilies is one of the best I have encountered. Many small details are made clear that are often omitted, to the distress of the amateur.

W. A. Constable treats the various types of lilies suitable for the amateur. It is written in an unusual manner as though taking a walk through the garden. Four groups of different situations are dealt with and give a very clear picture as to where you may plant each variety. This is a most interesting manner to deal with this subject rather than the very dry reading of just the usual lists. A brief but concise description of each variety as well as the proper location adds to the interest as well as the value.

Several references to the newly discovered lily *Mackliniae* found on Sirhoi Peak near Ukhrul, Manipur, in January, 1946. Seed was sent to England by F. Kingdon Ward and the first flowers appeared in 1948. For the present, at least, it has been classed as a lily rather than a *Nomocharis*. It appears to be quite distinct from any known species of *Nomocharis* or *Lilium*. Kingdon Ward has requested that it be named for his wife, formerly Miss Macklin. Three fine pictures show this new lily to have rather campanulate blossoms.

Great interest in hybridizing of lilies seems to be prevalent in New Zealand, and from the fine garden pictures they appear to have a suitable climate. L. Tuffery states that he is endeavoring to build up strains giving varied coloring in different varieties rather than one color. Several fine gardens are discussed in various parts of New Zealand.

Our own Mrs. Norman Henry's magnificent wild garden at Gladwyne, Penn., visited by Miss C. Beck, gives a most complete list of the lilies grown there. Her interesting account of carving such a natural garden out of the wilds was inspiring. Mrs. Henry is also noted for the varieties of iris she has collected. In fact, the greater portion of her garden is planted with material she has procured as a collector.

Growing lilies on the Mississippi Gulf Coast was another interesting phase of lily culture, ably presented by Margaret Halstead. Interesting sidelights on various shrubs and trees in her garden gives the reader a better picture of the local conditions. Personally I find these little side issues of many of the articles quite intriguing and create a longing to start out on a garden tour of the world.

An Historical Note of the *Lilium Hansonii* and Peter Hanson for whom the lily was named is a bit of interesting reading. It always satisfies my great streak of curiosity as to where a plant came from and why it received a certain name. These bits of information seem to make a plant more interesting.

As you near the end of this informative book and pleasant garden visits you find about one-third of the book devoted to round table discussions of various lily meetings and gatherings. This part alone is well worth the entire price of the book for the general information secured from expert lily growers. Throughout the entire discussions again appear the drainage problems. Careful reading of these various discussions helps one to solve many problems of lily culture and certainly whets the appetite for more and more lilies.

MRS. F. B. EYLAR

The Rhododendron Yearbook: 1949. No. 4; Conference Number. Published by The Royal Horticultural Society of London. Price 8/6.

ALWAYS awaited with interest, the 1949 Rhododendron Yearbook surpasses all previous editions, both in size and content. In addition to the usual yearly summary it reports the 1949 Rhododendron Conference, the first to be held since some time prior to the war years.

The importance of this conference is evidenced by the splendid papers read at the conference and reproduced in this volume as well as the detailed report of the Rhododendron Tour conducted by the Rhododendron Section of the Royal Horticultural Society.

One's first impression of the book, however, is not these splendid articles but the cover color reproduction of *R. "Elizabeth"* grown by Lord Aberconway. It not only captures the eye but the imagination and envy of all. It is a hybrid between *R. repens* and *R. Griersonianum* and "inherits neither the slight tenderness of *R. Griersonianum* nor the fastidiousness of *R. repens.*" Truly a hybridizer's dream. The sad part is that this beautiful gem is not in commerce nor is there any sign that it will be for some time to come. So we reluctantly turn away from this decorative color jacket to the interesting contents of the book itself.

"Rhododendrons in the Wild" is always a fascinating subject, especially when handled by a man like F. Kingdon Ward, who has both botanical knowledge and a keen appreciation of beauty. His experiences in Yunnan, Tibet, Assam, Burma, and the Himalayas are to most Rhododendron growers like glimpses of fairyland. Forests aflame with tree rhododendrons vying with their competitors for a place in the sun and dappling the forest paths with spent blossoms. "One stepped from crimson-scarlet red hot cinders into pools of sulphur yellow, apricot and purple, thence again into blood red."

Sometimes these grow as ephiphytes flowering like orchids from the mossy limbs of trees. Again on the higher and drier ranges "thousands of acres of rhododendron heath gleaming in the sun" and mantling the hillside with blue, lavender, purple and gold, or falling over cliff and crag in a foam-crested sea of flowers.

Such descriptions take us far from our gardens but only momentarily, for the greater our knowledge of the growing conditions in the wild the more successful we become in adapting them to our own uses.

Garden rhododendrons are covered by four excellent articles: "Rhododendrons in the Garden," by Lord Aberconway; "Hybrid Rhododendrons," by F. J. Rose; "Garden Hybrid Rhododendrons," by O. C. A. Slocock, and "Notes on Some Hardy Hybrid Rhododendrons," by Frederick Street.

Each of these covers a different phase. Lord Aberconway deals primarily with soil, location, grouping and choice of plants. His comments bear careful study by all growers. Mr. Rose and Mr. Slocock discuss the origin and parentage of many of our finest hybrids with an extensive discussion on what has been accomplished—likely parents and inherited qualities. Anyone contemplating new crosses will find here much that will be helpful. The ordinary grower will be interested in knowing more about some of the old garden favorites and many of the newer ones.

Mr. Street makes an interesting survey of a Rhododendron catalogue issued in 1886; it is pleasant to find that some varieties listed there are still being used in our gardens and still carry merit ratings, despite the fact that they were first produced nearly 100 years ago.

One is forced to the conclusion that any hybrid which has withstood the competition of a host of "debutantes" each year for so long a period and still retains its popularity must indeed have outstanding merit.

"The Rhododendron Tour" by N. K. Gould is like something taken from a dream boat—Exbury, Minterne, Caerhays Castle, Penjerrick, Trengwainton, Trewithen, Heligan, Tregothnan, Bodnant and others—gardens we have read and dreamed of—gardens whose owners evidenced an appreciation of Rhododendrons long before they became generally popular, some from the time of the earliest imports of Asiatic species—gardens in which many of our finest hybrids have been developed. All this on a specially conducted tour by the Conference Committee. It reads like a Rhododendron Shangri La. To those of us who were unable to go, the description by Mr. Gould will do much to give us a mental picture of the visual one we missed.

"Rhododendrons at Caerhays Castle," by Mr. Charles Williams, might be considered as an extension of the Rhododendron Tour for it covers in more detail this lovely garden which Mr. Gould touched upon only briefly.

Propagation is splendidly handled by Mr. Hanger and deals not only in methods but soil requirements as well.

For the scientist and student there is "A Survey of the Genus Rhododendron" by Dr. J. Macqueen Cowan, and "A Review of Rhododendrons in Their Series" by Dr. Cowan and H. H. Davidian. This latter is the fourth in a series of such papers published by the Society and promises a gradual revision of the entire genus.

There is, of course, a comprehensive report of the 1949 Rhododendron Show, as well as the Rhododendron awards of the year.

Herbert Ihrig.

Hedges for Farm and Garden, by J. L. Beddall. London, Faber and Faber, Ltd., 1950. 360 pages. Illustrated.

AN INFORMATIVE and detailed writing divided into three parts, all interestingly written. The farm or country hedges of England are shown to be a serious and integral part of life. Indeed there are several aspects of hedges this reader, for one, had not considered. After pondering Mr. Beddall's chapters, American farmers, gentlemen farmers and suburbanites might well give serious thought to some of them.

There are chapters on planting and care of hedges, lists of plant materials for various types of hedges (some of which will startle and tempt Northwest gardeners) hedges for various purposes and locations, training, trimming, renovating, costs, legal aspects of hedges. Also, discussions of stone and turf hedges and of fences.

Any property owner who has a hedge, either clipped or unclipped, or a screen planting will find valuable information in this book. This reader was particularly happy to note, regarding the English Laurel (Prunus laurocerasus) as a hedge: ". . . must not be trimmed with shears as such treatment ruins the appearance of the hedge," and further, "If left to grow naturally it will make a fine informal hedge, flowering in early spring."

While the lists are for "hedge" plants they could well be considered as specimens or as ornamentals; particularly where there is a classification as to flower, foliage and fruit colors.

The book is well-illustrated with good, clear photographs to show types and varieties and with line drawings to show care and maintenance processes.

Roberta A. Wightman.

ARBORETUM NOTEBOOK

This department is published for correspondence and pertinent comments by experienced growers on interesting plants and their culture. We solicit your questions but space limitation necessitates the publishing of only such answers as we deem of general interest.

Asarum Caudatum, our native ginger, is a perfect ground cover for moist, shady places. Its large, shining, evergreen leaves are lovely and have a delightful fragrance. As it spreads rapidly, one does not have to wait long for a nice effect.

If you have a suspicion that your peonies are too deeply planted, in the beginning of March turn the hose on the eyes, exposing them to the weather. It is a good idea, too, to soak the surrounding soil thoroughly, softening it so the water leaching through the fertilizer may more easily reach the roots.

For several years my neighbor across the street has had a large Fairy Ring in his lawn. So the writer was not surprised when last summer one appeared in her lawn. She immediately pulled out and burned the mushrooms and thoroughly soaked the infested area with a solution of one teaspoon Lysol to each gallon of water, repeating the treatment three weeks later. Up to date there has been no recurrence of the Fairy Ring.

E. D. Harisberger

* * *

The gardens in Victoria are necessarily quite different from our Seattle gardens because of the great outcroppings of huge rocks. A recent visit to the Victoria Spring Garden Festival when many gardens were open to the public was inspirational in many ways to the Seattle visitors. Every gardener we met mourned over the losses of the past winter and we could fully sympathize with them. One charming garden had many rare plants and bulbs tucked in the chinks of the rocks and we were entranced with the clever placing of shrubs at every vantage point. Often they were not unusual, a Spiraea prunifolia fl. pl. at the turn of one path and a Forsythia at another. The careful pruning to form interesting and spare, graceful lines was the secret of their charm. The house itself was built of frame siding, the lower half painted white, the upper half left to weather. The blinds, painted blue, gave it a nice touch of color. Over the lower story there was a restrained planting of espaliered trees and vines. The *Clematis montana rubens* across the front of the house was kept back to beautiful outlining ribbons, the pink blossoms making a charming combination with the blue blinds. At the end of the house there was a Wistaria, also a Quince and one or two trees at the end of the house, including a *Magnolia grandiflora*, clipped so close they looked part of the architectural plan. This gave a satisfying feeling that the house was definitely a part of the garden. Over the rocks in carefully chosen places were plantings of many choice rock plants, shrubs and bulbs and between the rocks were long stretches of *Meconopsis Baileyi* (not yet in bloom) and spring bulbs in great masses. I was interested to see how often the little *Juliae* hybrid, Dorothy, was used for fillers everywhere. Its bloom was at its height and its warm shade of creamy white with sometimes a pinkish cast was an excellent foil and a charming addition to bulb planting.

A little tulip, new to me, was *Tulipa Batalini*, clinging to the rocks with crinkled, spidery foliage and large, pale yellow blossoms. By stooping we discovered it was distinctly fragrant. We went back to this garden a second time for the joy of repeating a great pleasure.

Another garden we especially admired, not for its masses of color but for its intimacy and subtle charm. It was a bit of woodland among the native oaks that also make Victoria distinctive. The owner had himself collected wild treasures from all over the United States and Canada; ferns especially, and each plant had an especial appeal and interest to him. There were Jacks-in-the-Pulpit, Solomon's Seal, Mandrakes, Anemones, wild Cyclamen and many *Fritillaria Meleagris* which had seeded themselves in the most telling locations. There was the rare Snake's Head Iris *(I. tuberosa)*, green flowers with black blotches. *Iris vicaria*, quite unusual, with blooms up and down the stem. There was a beautiful Muscari from Cilicica *(M. Pinardi)* and Dog Tooth Violets everywhere. Seeing this garden and meeting its owner was an experience which will be long remembered.

G. T. D.

* * *

For those who have a woodland garden there is a glorious Japanese importation called *Glaucidium palmatum*. It grows about twelve inches high with soft leaves about the stem suggesting a large *Anemone nemorosa*. The blossoms are a delicate bluish-lavender, two inches across. The whole plant has the exquisite texture of many plants that grow in shady places. This is worthy of a choice location.

A. B. C.

* * *

Dear Sir:

Re. your request concerning the survival of Montbretias and of Schizostylis, I wish to report the following: Montbretias, mostly the older varieties, are vigorous and healthy. They are planted in two locations, both near the house; one bed facing east and one south, the latter receiving only a few hours' sun. The Kaffir lilies (the botanical name quite overwhelms me) varied. A clump in an open bed facing east and west, semi-protected by a peony and delphinium, came through perfectly. A clump protected by a hydrangea and daffodil growth in a bed facing south, at the back of the house, seems also vigorous. A clump in an open bed receiving sun all day are reappearing slowly but are not so vigorous. A clump in an open bed facing north and south have not so far appeared but I have hopes. The advice concerning both Montbretias and schizostylis is much appreciated. I plan to replant both kinds of plants following your directions. "Mrs. Hegarty" is the name of the Kaffir lily in my garden.

Frances M. Tarr, Tacoma

* * *

Question: Should I add ammonium sulphate to my sawdust when putting on the ground?

Answer: Yes, to avoid shortage of nitrogen in soil and consequent yellowing of plant foliage.

Question: Does it matter what kind of sawdust you use? That is, is there a difference in the amount of resin or gum in the wood and what is put on the plants?

Answer: There is a difference between the conifers containing resin and other trees, but so long as fertilizer is used with the sawdust. Rhododendrons and azaleas at least do not appear to object to the former type.

Question: What is the difference between new and old sawdust?

Answer: New sawdust takes a certain amount of nitrogen from the soil while in the process of decomposing. The more rapidly the sawdust decomposes, such as alder, then naturally the less nitrogen is taken. Fir and cedar take longer and usually cedar takes the longest of all. Ammonium sulphate should be added if there is indication of too much loss of nitrogen. Old or already decomposed sawdust will not, then, use as much nitrogen. The finer the sawdust used for soil building the better, as decomposing is faster. The coarse should be used only as mulch.

Question: Will the sawdust break up the ground?

Answer: Only in the top few inches will it act as a mulch, help keep weeds down and hold moisture. Of course, this will not do the ground any good around the roots, a foot or so down. The whole bed would have to be worked before any plantings were made.

Question: When is the best time to transplant a "Pink Perfection" Camellia about 3 to 4 years old?

Answer: If small it can be moved in May even with buds or flowers; better in late October or early November.

* * *

List of Plant Names

(Continued from Spring, 1950)

caribaeus	of the Caribbean
caricosus	carex-like
carinatus	keeled
carinifera	keel bearing
Carissa	aboriginal name
Carlina	said to have cured the army of Charlemagne
Carludovica	Charles 4th and his queen Louisa
Carmichaelia	after Capt. Dugald Carmichael, Scotch botanist
carminatus	carmine
Carnegiea	after Andrew Carnegie
carneus	flesh-colored
carniolicus	of Carniola (South Central Europe)
carnosus	fleshy
carolinianum	from Carolina
carolinianus	Carolinian
carpathicus	of the Carpathian region
Carpenteria	after Prof. Carpenter of Louisiana
carpinifolius	Carpinus-leaved
Carpinus	ancient Latin name of the Hornbeam
Carrierea	for E. A. Carriere, French botanist
Carthamus	Arabic name, alluding to color of flowers
cartilagineus	like cartilage
Carum	probably from Caria in Asia Minor
Carya	Greek name for walnut tree
caryophyllaceus	clove-like
caryopteridifolius	caryopteris-leaved
Caryopteris	Greek for nut and wing
Caryota	old Greek name
caryotaefolius	caryota-leaved
cashmerianus	of Cashmere
Casimiroa	for Cardinal Casimiro Gomez de Ortega
caspicus	Caspian
Cassia	ancient Greek name
Cassine	name used by Indians in Florida
cassinoides	Cassine-like
Cassiope	Greek mythological name
Castanea	ancient Latin name for chestnut
Castanopsis	chestnut-like
Castanospermum	chestnut-like seed
Castilleja	Spanish botanist, D. Castillejo
Casuarina	probably named from resemblance to Cassowary (Casuarius)
catacosmum	adorned
Catalpa	an Indian name
catalpifolius	Catalpa-leaved
Catananche	Greek name
Catasetum	Greek for downward and bristle
catawbiense	from Catawba, N. Carolina
Catesbaei	for Mark Catesby, a naturalist
catharticus	cathartic
cathayanus	of Cathay
Cattleya	for William Cattley, early English botanist
caucasicum	from the Caucasus
caucasicus	belonging to the Caucasus
caudatus	tailed
caulescens	becoming stem-like
caulialatus	wing-stemmed
cauliflorus	stem-flowering
Caulophyllum	Greek, stem-leaf
Cavaleriei	after J. Cavalerie, a French collector in China
Ceanothus	ancient Greek name
Cecropia	Greek, from wood used to make wind instruments
Cedrela	from Cedrus; wood resembles Cedrus
Cedronella	a little cedar; odor resembles a variety of cedar
Cedrus	ancient Greek name of a tree
celastrinus	celastrus-like
Celastrus	ancient Greek name
Celmisia	mythological name
Celosia	Greek name
Celsia	for Olaus Celsius, a Swedish orientalist
Celtis	ancient Greek name of a tree
cenisius	of Mt. Cenis
Centaurea	a Centaur, famous for healing
centifolius	hundred-leaved
Centradenia	Greek for spurred gland
Centropogon	Greek, spur and beard
centranthifolius	Centranthus-leaved
cephalanthum	flowers in heads
Cephalaria	Greek, head; capitate flower clusters
Cephalocereus	referring to crown of long hair
cephalonicus	of Cephalonia
Cephalostachyum	Greek, head and spike

Cephalotaxus	Greek, flowers in heads or clusters
cephalotes	head-like
ceraceum	wax-like
ceramicus	ceramic, pottery-like
cerasifera	cherry-bearing
cerasiformis	cherry-shaped
cerasinum	cherry-like
cerastioides	Cerastium-like
Cerastium	Greek, horn, referring to shape
ceratocaulis	horn-stalked
Ceratonia	Greek for horn
Ceratopetalum	Greek, horned petal
Ceratopteris	Greek, horned fern
Ceratostigma	Greek, horned stigma
Cercidiphyllum	leaves Cercis-like
cereale	pertaining to Ceres or agriculture
cerefolius	wax-leaved
cerifera	wax-bearing
Cerinthe	Greek, wax and flower; Greeks thought bees visited flower for wax
cerinthoides	Cerinthe-like
cerinus	waxy
cernuus	drooping, nodding
cerinum	wax colored
cerochitum	covered with wax
Ceropegia	Greek, wax and fountain
Ceroxylon	Greek, wax and wood
Cestrum	old Greek name
Chaenomeles	Greek, to split and *meles*, apple
Chaenostoma	gaping mouth, referring to shape of corolla
Chaerophyllum	Greek, referring to scented foliage
chaetomallum	with fleecy hair
chalarocladum	with loose shoots
Chamaecyparis	chamai, dwarf, and kyparissos, Cypress
Chamaedaphne	chamai, dwarf and Daphne
Chamaedorea	Greek, dwarf and gift
Chamaelirum	dwarf lily
Chamaerops	Greek, dwarf bush
chamaetorrum	creeping
chamaezelum	growing on the ground
chamaeunum	lying on the ground
Championae	after Mrs. Champion, wife of the discoverer
Chapmanii	after A. W. Chapman, American botanist
charianthum	graceful flowers
charidotes	giving joy
Charieis	Greek, elegant
charitostreptum	gracefully bent
chartophyllum	paper-like leaves
chasmanthoides	resembling chasmanthum
chathamicus	of Chatham Island
chawchiense	from the Chawchi Pass

(To be Continued)

* * *

Yellow Mottle Leaf, a Virus Disease of Camellias

(Continued from Page Sixteen)

free propagation stock. Unfortunately, the presence of the virus in certain varieties may not be apparent when the plants are growing under some conditions, yet very apparent when the plants are growing under other conditions. Therefore, to be certain that apparently clean plants chosen for propagation are really free from virus, some system of testing or indexing will have to be employed. While the details for such testing have not been worked out, one method would involve budding pieces of the supposedly clean plant on young seedlings and observing the further development of the seedling. If the seedling continues to develop normal leaves, the test plant may be assumed to be suitable for general propagation.

Finally, one word of reassurance to the home grower. While variegation in some camellia leaves, and especially unsightly irregular variegation, is usually due to a virus and is transmissible by budding, there is no danger of its being transmitted within a garden by touch, handling the plants, or picking flowers. Also, we have not observed evidence of rapid spread of the disease within garden areas by means of insects or other natural carriers. Nothing is known about the insect carriers or vectors of the disease.

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Menzies

(Continued from Page Eight)

onum, Lonicera nootkatensis, Gaultheria fruticosa, Spiraea serrulata, Rubus nootkatensis; others from particular circumstances were doubtful and could not be ascertained till they are hereafter compared with more extensive descriptions and on my return to England."

Menzies had evidently forgotten for the moment that he was in the navy and that in his signed instructions all material gathered must be turned over to the Secretary of State upon his return to England. As a result, it was 60 years before the government at last attended to having that material checked, described, and published. The credit for a new plant depends on the date of publication, not on the time it was found and described. The Dogwood described by Menzies in 1792 is a good example of this. In 1840 Audubon described, named and published an article on the Dogwood and honored his friend, Thomas Nuttall by calling it *Cornus Nuttallii.*

In all, over 300 species are credited to Menzies from the Northwest area and to about 25 Menzies' name has been given. The great botanist and first president of the Linnean Society, Sir J. E. Smith, named many of the specimens sent him during the years 1789-91. Later work was done by both Sir W. J. Hooker and F. T. Pursh.

Menzies retired from the navy and practiced medicine for many years in London. He made no further trips of exploration but his interest in botany continued. He was president of the Linnean Society and his advice and help was sought by the younger botanists, Asa Gray, Douglas and Scouler, before they, too, started on their great adventures into the North Pacific.

A few of the trees and plants credited to Menzies are:

Abies grandis—White Fir
Abronia latifolia—Sand Verbena
Acer circinatum—Vine Maple
Acer macrophyllum—Broad Leaf Maple
Allium acuminatum—flowering onion
Arbutus Menziesii—Madrona
Lupinus Menziesii
Penstemon Menziesii
Phacelia Menziesii
Ribes Menziesii
Ribes sanguineum—Red flowering currant
Ribes speciosum—Gooseberry
Rubus stellatus—Dewberry
Rubus nutkanus—Nootka Sound Bramble—raspberry
Rubus spectabilis—Rosy-flowered Bramble—Salmonberry
Sanicula Menziesii—Snake root

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Conifers on the West Coast of Scotland

(Continued from Page Fifteen)

canadensis and several others are to be found in places, but seldom as more than isolated specimen trees. They never have anything approaching the vigor of the species from Western America. One or two conifers from South America are interesting; the monkey puzzle for instance *(Araucaria araucana)*, of which there is actually a plantation at Monreith (Wigtown) is remarkably hardy.

Conifers from Continental Europe are, of course, prominent in the woods of Western Scotland; among them Scots pine *(Pinus sylvestris)* deserves special mention, not because it is the most important tree but because it is the only conifer native to Scotland of economic value; the other two conifers—the yew *(Taxus baccata)* and the common juniper *(Juniperus communis)*—being more or less shrubs. Scots pine was the main species in the ancient Caledonian forests which covered so much of Scotland at one time. Little of this forest still exists in anything like its original state, but a few portions are still worth visiting. Among those are the primeval woods around Loch Maree in Ross-shire, some lovely stands which produce timber of fine quality at Achnashellach in the same county, the famous Blackwood of Rannoch in northern Perthshire and some small remnants at Glen Falloch and in Glen Orchy in Argyllshire.

Common or Norway spruce was introduced into the country centuries ago so that it is possibly the commonest tree as well as the most important timber-producer in the conifer woods of the west. European larch, which has produced fine timber much sought after for boat building, was introduced from Europe in the middle of the eighteenth century. There have, however, been many places where this species has failed badly, but it is becoming apparent now that this was because unsuitable, high Alpine strains were tried instead of races from the European plains. This race is much less susceptible to frost in Great Britain than the Swiss or other mountain strains. The common silver fir *(Abies alba)* when introduced over 200 years ago grew quickly to enormous size in the west of Scotland. Some of the finest specimens are to be found at the Duke of Argyll's castle at Inverary on Loch Fyne. Unfortunately this tree is now very difficult to raise on account of a Chermes. Several other European silver firs, however, including *Abies Nordmanniana* from the Crimea grow well and are not susceptible to the insect. Among the pines introduced from Europe probably the most important is the Corsican pine and although some fine specimens have been grown in Western Scotland this is more a tree for the drier eastern regions.

Heading the lists of useful conifers from Asia must be placed the Japanese larch, a tree which grows supremely well in the moist climate of Western Scotland. It is immune to the troubles of its European cousin (larch canker) and less susceptible to several insect pests. The Japanese and European larches are the parents of a useful hybrid of remarkable vigor which also grows well in Western Scotland where it has proved to be not only fast growing but hardy. Specimen trees of other East Asian larches such as the Kurile larch *(L. Gmelinii* var. *japonica)* are to be found in gardens. Although not planted to any extent in woods quite a number of other conifers from Asia are to be found in the west of Scotland, such species as the Himalayan cedar *(Cedrus Deodara)* and of the very fine spruce *(Picea Smithiana)* from the same region. Several species of silver fir from China such as *Abies Forrestii* are quite at home and naturally foresters in the west of Scotland as elsewhere are quite excited about the *Metasequoia disticha,* recently discovered in China.

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Late Summer Flowering Shrubs

(Continued from Page Thirteen)

The best of the Caryopteris species is *C.* x *clandonensis.* It makes a bush up to 5 ft. in height by 4 ft. across, with narrow grey-green serrated leaves and bears, from August to October, semi-circular clusters of deep lavender-blue flowers, each individually small, but very attractive in the mass. When examined closely the fringed edge of the corolla is fascinating.

Ceratostigma Willmottianum is an angular little shrub of 2 ft. or so. With protection from biting winds, which can be provided by larger shrubs nearby, it produces loose heads of bright deep blue flowers from August to September.

Good reds and pinks are quite difficult to find in the later-flowering shrubs. *Punica Granatum* is well worth growing if a really sheltered spot can be found for it on a south wall in the sun. The fruits seldom ripen but the bright orange-scarlet flowers, borne from July to September, are delightful. The double form, var. *flore pleno,* is magnificent, and a wonderful specimen may be seen growing on the wall of the Bishop's Palace at Wells, England.

One of the outstanding later shrubs is *Desfontainea spinosa,* which makes a bush of 6 feet by 8 feet. It is evergreen with light green, holly-like foliage and bears tubular flowers of scarlet tipped with gold from July to October. There seems to have been difficulty in growing it, but if it is given a shady, sheltered and moist site it is quite happy and easy. Like the Eucryphias it must have constant shade at the root and top dressings of leaf mould.

Two interesting orange and red climbers are *Campsis grandiflora (Bignonia grandiflora)* and *C. radicans. C. grandiflora* needs all the sun it can get on a sheltered south wall. It will then climb to about 15 feet. The orange and red trumpets are borne in quantity throughout the late summer. If happy it is one of the best of all climbing plants. *C. radicans* is hardier than *grandiflora,* more rampant, and clings to a wall by means of aerial rootlets.

Of the few good pinks *Rhododendron* "Azor" *(Griersonianum* x *discolor),* a clear pink, just scrapes within the bounds of this article by blooming in July. There are several hybrids of "Azor" worth investigation.

The pink *Ceanōthus* "Marie Simon" is not as vigorous a grower as *C.* "Gloire de Versailles" and requires less severe pruning. Making a neat little shrub of 5 feet by 4 feet, its light powdery pink sprays of flowers give a good display through July to October.

A fine shrub for a lawn specimen is *Rhus Cotinus.* Commonly known as the Smoke Tree, it grows up to 12 feet by 9 feet with oval leaves up to 3 inches in length. The soft pink down of its flowers envelops the plant in a cloud of rosy smoke, slowly fading to smoky-grey. The leaves yellow as the flowers fade, making it a wonderful example of fall color. A very fine form of this is *foliis purpureis* with rich red-purple foliage. Beware of *atropurpurea* which is poor by comparison.

The Silk Tree—*Albizzia julibrissin rosea*—makes another handsome, wide, bushy-headed little tree of 18 feet with a wider spread. The massed flowers set on top of the leaf clusters, as with Chestnut plumes, are brushes of thin pink-flushed stamens, like a feather of silk.

These shrubs carry on the flowering season through the afternoon of the year and provide great pleasure, with little trouble, for those who are growing older and no longer have the enthusiasm to plant masses of annuals for late summer color. They are interesting, they are fun, so try some of them.

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Woodland Garden—1950

(Continued from Page Eleven)

on the same shrub. *V. dentatum,* Arrowwood, and *V. acerifolium,* Mapleleaf Viburnum are at home here. The latter is ideal for facing down taller shrubs and enjoys the shade, even if it is in a dry situation.

The common Witchhazel, *Hamamelis virginiana,* displays its straps of yellow in November and December. The Vernal Witchhazel, *Hamamelis vernalis,* prefers a moist spot along the stream and opens its small, fragrant red or yellow flowers in February and March.

One shrub rarely seen in garden cultivation is the Fothergilla. Coming from the Southeast, the Alabama Fothergilla, *F. monticola,* is attractive for its white dense spikes of white stamens, giving a bottlebrush semblance. It blooms in late May.

Many of the exotic shrubs enjoy woodland atmosphere. Two which extend bloom during the winter months are the Chinese Witchhazel, *Hamamelis mollis,* and the Wintersweet, *Chimonanthus praecox.* Both are noted for their fragrance. Again, the Viburnums, the Asiatic species this time, are found to be as versatile as our American species.

Many other shrubs have been included for their own particular charm, but those above mentioned give an idea of some of the plants to be found in this woodland.

All tree and shrub plantings will be completed by 1951. The work for the next several years consists of maintenance operations, weed control and cultivation. These are the efforts now which will pay the future dividends of strong healthy growth.

In this day of speed and fast living in our daily lives and of the demands for immediate effect in our garden lives, we still have to accept Mother Nature's dole. To be sure, we can help by good soil and fertilizer plus proper care to hasten growth. But it actually takes years of living to develop genuine beauty of character in plants. Our Woodland Garden changes from day to day and as the years add up, the trees and shrubs have that beauty of character which we will appreciate in "the last of life for which the first was made."

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Woodland Garden—1938

(Continued from Page Nine)

When the first plantings were put in, there was available very little money, so many of our women from the West Seattle Garden Club took picnic lunches and went to the Arboretum and spent days weeding. Many of the early plantings were destroyed by slugs and as the women weren't trained for "slugging," they gave teas and flower shows to raise funds for the "battle of the slugs," as well as for plants, etc. The horsetails, quack grass, blackberries and bindweed, thanks to the new weed-killers, have mostly succumbed. The plantings that have been put in since are thriving and adding to the beauty of the landscape. The Primroses in a lovely sequence of color may be seen at a great distance adding a glowing touch of color. The Hellebores (Xmas roses) flowered in great profusion earlier; later there will be lilies here and there on the hillside. At each season there will be something interesting to see.

Our native evergreen huckleberry *(Vaccinium ovatum)*, which will soon be a thing of the past unless we do something to conserve it, and the red huckleberry *(Vaccinium parvifolium)* are in groups, adding their charm to the hillside above the stream.

We hope the following, taken from a previous article in THE BULLETIN, expresses our aspirations for Woodland Garden:

"I think the Woodland Garden will achieve the spirit of that Garden, the dream of which the late Ernest H. Wilson carried so long in his heart and never planted, that garden of which he wrote:

" 'The garden that I love is richly peopled with pleasant folk—trees, shrubs, vines, herbs, birds, beasties, fairies and their ilk—and now and then I am privileged to listen to the wisdom that is theirs and bidden to heed the lessons taught.' "

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The Arboretum in the Spring

(Continued from Page Six)

to 100 persons. The credit for this must be given to the very active Arboretum Units, some thirty-six in number, which have been aiming at this target for some time past.

Our collection of colored slides made in the Arboretum at various seasons continues to grow; so does the demand by garden clubs, P.-T. A. and other groups to see them and we have shown and talked about them approximately once a week from February through May, over an area extending from Mt. Vernon to Port Angeles and south to Puyallup.

The number of visiting parties has also greatly increased over last year, and in May has been at the rate of almost one a day, as compared with one every three days in May, 1949. To provide an adequate guide service with our present limited qualified staff is difficult, and most of this work has fallen to the lot of Mr. Hansen, assistant director. One of our aims in the future must be to try to improve and expand such services as this to visitors and the community in general.

Crab Apples and Roses

(Continued from Page Twenty-one)

merly derelict area will be beautified by a succession of blossom and fruit—Crab Apples and early Rose species flowering in May, followed by the bulk of the latter and the older kinds in June and early July, then from August onwards a gradually increasing display of richly colored fruits of all shapes and sizes, lasting well into mid-winter. Few genera of hardy plants can provide more ornament to gardens than these two, especially in combination, or for a longer period.

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Raising Conifers from Seeds at Arboretum

B. O. Mulligan and L. J. Michaud

The following table indicates methods of seed treatment with conifer seeds received during the past three years at the Arboretum, with the results obtained. Stratification periods have chiefly been based on L. C. Chadwick's data in "Improved Practices in Propagation by Seed," (1936).

Seeds stratified are wrapped in cheese cloth with damp peat and kept in cans in a refrigerator at a temperature of 41°F. They are periodically examined for signs of germination, then sown in flats of sterilized soil and covered with Vermiculite to a depth depending on the size of the seeds, usually ⅛ to ¼ inch.

The temperature of the propagation house averages 55°F. at night and 65°F. by day

As soon as large enough seedlings are transplanted from the flat to 3-inch pots, grown on in a cool greenhouse until well rooted, then planted in cold frames in a peaty mixture. Here they are shaded by laths from direct sunshine in summer, and when necessary covered by glass lights in winter,—usually from November to March, depending on the weather. Again, when large enough, which varies with growth rates, plants are transferred to nursery rows for as long as may be necessary — in the case of Firs, Spruces, *Sciadopitys, Libocedrus,* etc., this period may extend to several years; Pines usually need one or two seasons in the nursery but may occasionally be planted out directly from the frames (e.g., *P. Pinaster).* Cypresses are an exception, being grown in pots and planted out from 5- or 6-inch size.

Seed Sources

Wind River Arboretum is at the Pacific Northwest Forest and Range Experiment Station, Carson, in south Washington. *Placerville* refers to the Institute of Forest Genetics at Placerville, Central California. Both are operated by the U. S. Department of Agriculture Forest Service. Seeds of many species have been received from botanic gardens in various countries; some have been collected in the wild state, and have come directly or through an intermediary to the Arboretum. "Seed Source" or "Remarks" will usually indicate these.

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Species	Seed Source	Days Strat. Period	Sown	Germination Date	Germination	Remarks	Plant Size Oct. 1949
ABIES AMABILIS	Wind River Arboretum	....	12-26-46	2-7-47	Good	2d germinat'n 5-47	2-4"
— PROCERA (NOBILIS)	Wind River Arboretum	82	2-25-47	4-7-47	Poor		2-4"
— —	Wind River Arboretum	....	12-26-46	1-16-47	Very good	2d germinat'n 4-47	4-8"
NOTE: Stratification apparently unnecessary and detrimental, but more trials needed.							
CUPRESSUS ARIZONICA	Victoria, B. C.	60	2-6-48	3-20-48	Poor		10-12"
— — — — var.	Mexico	72	1-4-49	1-21-49	Very good	F. Meyer no. 3038 Growing well	12-16"
— FUNEBRIS	Valencia, Spain	74	11-23-48	12-11-48	Good		6-8"
— LUSITANICA	Coimbra, Portugal	77	5-10-48	5-14-48	Very good		24-30"
— NEVADENSIS	Placerville, Calif.	106	8-3-48	8-10-48	Fair	Seed collected 1939 Good growth	10-18"
— PYGMAEA	Fort Bragg, Calif.	88	8-5-48	8-12-48	Good		24-30"
— SARGENTII	Placerville, Calif.	106	8-3-48	8-10-48	Fair	Seed collected 1935 Grow'g rapidly	12-18"
— SPECIES (L. & S. 13345)	Tibet	108	8-3-48	8-10-48	Very good		6-10"
— TORULOSA	Valencia, Spain	74	11-23-48	12-11-48	Good	Growth satisfact'y	12-15"
NOTE: Stratification of fresh seeds for 70 to 90 days gave good results, but seeds 10 to 13 years old will still germinate. Growth rate rapid.							
JUNIPERUS CEDRUS	Placerville, Calif.	178	10-12-48	11-16-48	Fair	Seed collected January, 1940	4-6"
LARIX LYALLII	Wind River Arboretum	....	12-26-46	3-6-47	Very good		2-3"
LIBOCEDRUS CHILENSIS	Chile	45	8-5-48	8-16-48	Very good, rapid		3-6"
METASEQUOIA GLYPTOSTROBOIDES	W. China	54	3-15-48	4-12-48	Fair	Eaten down by rabbits, 1-49	12-16"
PICEA ASPERATA	Arb. des Barres, France	84	8-6-47	8-24-47	Very poor		6"
— BICOLOR	Geneva, Switzerland	....	3-26-47	4-17-47	Very good		6-10"
— BICOLOR	Gothenburg, Sweden	76	11-21-46	12-15-46	Very poor	Very slow growth	1"
— ORIENTALIS	Gothenburg, Sweden	76	11-21-46	12-15-46	Very poor		4"
— WATSONIANA	Arb. des Barres, France	84	8-6-47	8-31-47	Very poor		
NOTE: Spruce seeds should evidently be sown when fresh.							
PINUS AYACAHUITE	England	53	3-25-48	4-7-48	Very good	Growth slow	4"
— BUNGEANA	Philadelphia	86	6-1-48	6-30-48	Fair, slow	Slow in growth	4-6"
— — — —	Peiping, China	107	8-3-48	8-25-48	Fair	Seed collected '46	4-6"
— COULTERI	California	72	3-23-48	4-11-48	Fair, rather slow		10"
— ECHINATA	Placerville, Calif.	72	8-3-48	8-12-48	Very good, rapid	Rather slow growth	4-7"
— GLABRA	South Carolina	107	8-3-48	8-10-48	Very good, rapid	Growth fair	6-10"
— FLEXILIS	Seedsman; Mass.	54	3-25-48	4-7-48	Good	Slow in growth	3"
— LAMBERTIANA	Wind River Arboretum	84			Good		12"
— — — —	California	65	5-10-48	5-24-48	Very good fairly rapid		4-7"
— MASSONIANA	Shanghai, China (Seed Co.)	43	9-3-48	9-15-48	Very good, rapid	Growth rate good	6-9"
— MURICATA	California	93	8-3-48	8-10-48	Very good, rapid	Growth fair	7-12"
— PARVIFLORA var. GLAUCA	England	52	3-25-48	4-22-48	Fair, rather slow	Slow growth	2-4"
— PATULA	Placerville, Calif.	107	8-38-48	8-15-48	Poor but rapid	Seeds collected in Mexico, 1926	4-8"
— PEUCE	Seedsman; Mass.	30	4-21-47	5-19-47	Good, rather slow	Slow growth	3-6"
— PINASTER	Seedsman; New York	155	8-6-47	8-17-47	Very good, rapid		12-30"
— PINEA	Palermo, Sicily	56	11-23-48	12-11-48	Poor	Growth good	12"
— PSEUDOSTROBUS var. ESTEVEZI	Mexico	73	1-4-49	1-18-49	Good, fairly rapid	F. Meyer no. 3087	4-8"
— SABINIANA	California	93	8-3-48	8-25-48	Fair	Growth good	12-15"
— SPECIES	Florida	114	8-3-48	8-25-48	Very good	Growth fast May be P. Elliottii Engelm.	8-24"
— TORREYANA	Seedsman; California	155	8-6-47	8-20-47	Good, fairly rapid	Growing satisfac'y	10-14"
— YUNNANENSIS	Morton Arb., Lisle, Ill.	71	5-10-48	6-1-48	Very good		4-8"
NOTE: Successful results obtained with variable periods of stratification, as recommended by Lela V. Barton (1928 and 1930). Age of seed also important.							
PSEUDOTSUGA MACROCARPA	Placerville, Calif.	107	8-3-48	8-10-48	Rapid, but poor	Seed collected '34	3-6"
— WILSONIANA	Taiwan (Formosa)	52	6-2-48	6-22-48	Fair	Growing satisfac'y	6-10"
SCIADOPITYS VERTICILLATA	Gothenburg, Sweden	78	11-22-46	2-18-47	Slow, fair	Slow in growth	3"
TSUGA CHINENSIS	Taiwan (Formosa)	53	6-2-48	7-2-48	Good		2-6"

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